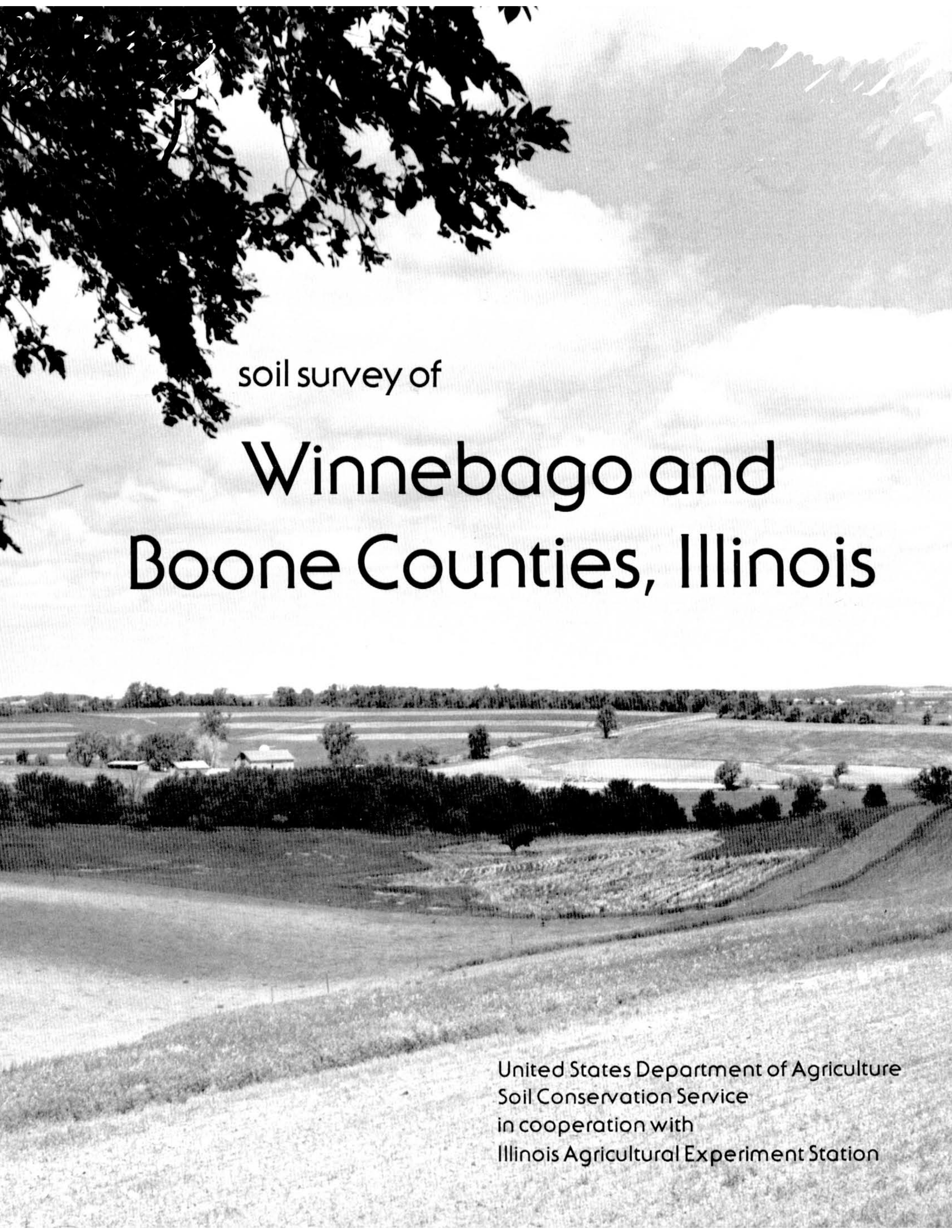


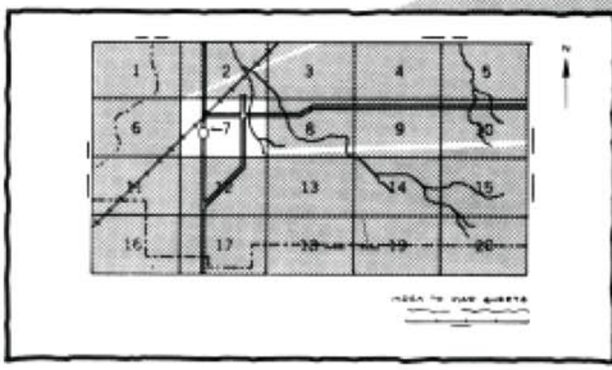
soil survey of

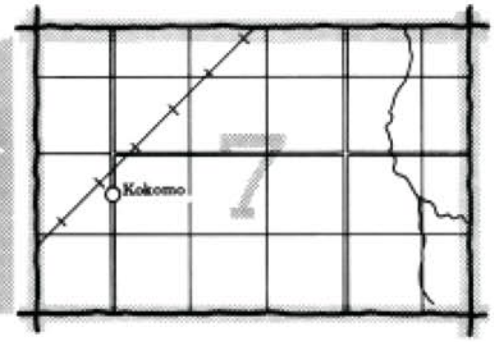
Winnebago and Boone Counties, Illinois

United States Department of Agriculture
Soil Conservation Service
in cooperation with
Illinois Agricultural Experiment Station

HOW TO USE

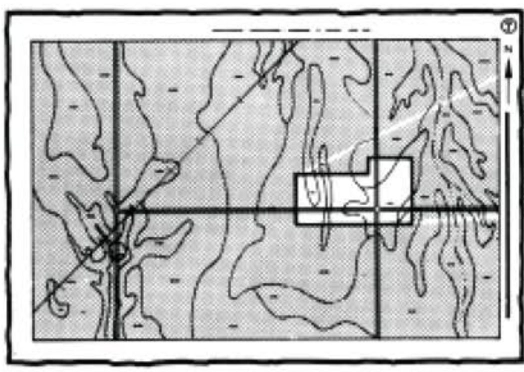
1. Locate your area of interest on the "Index to Map Sheets"

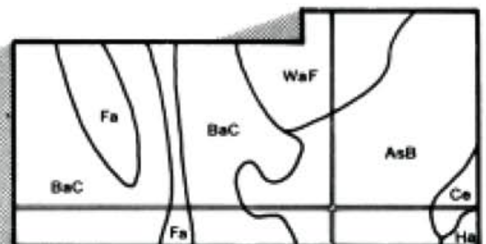




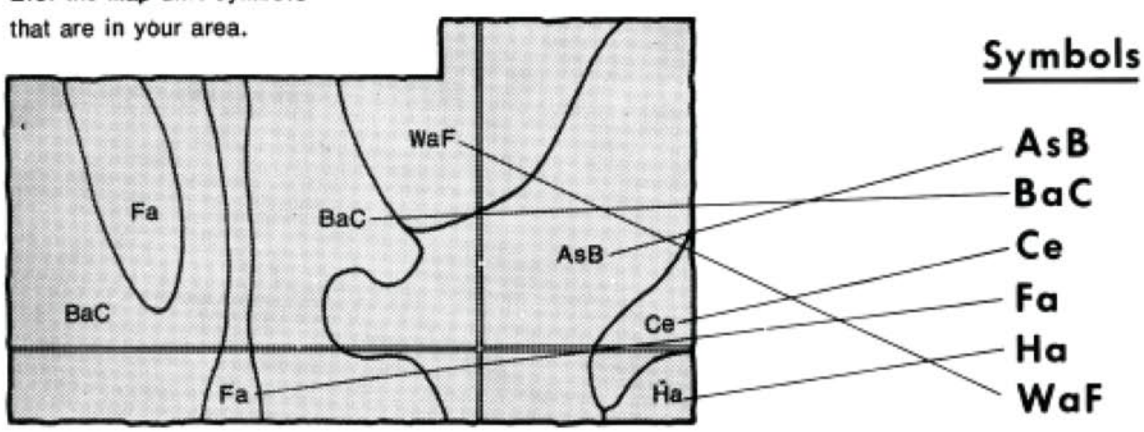
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



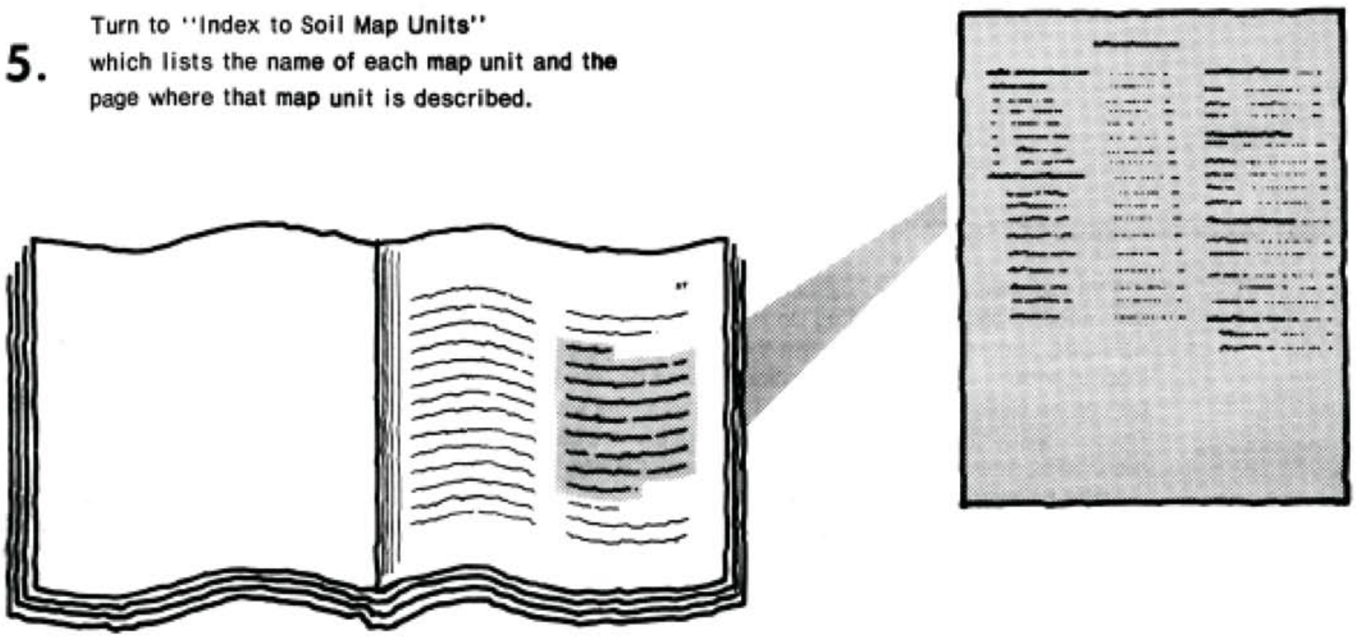


4. List the map unit symbols that are in your area.

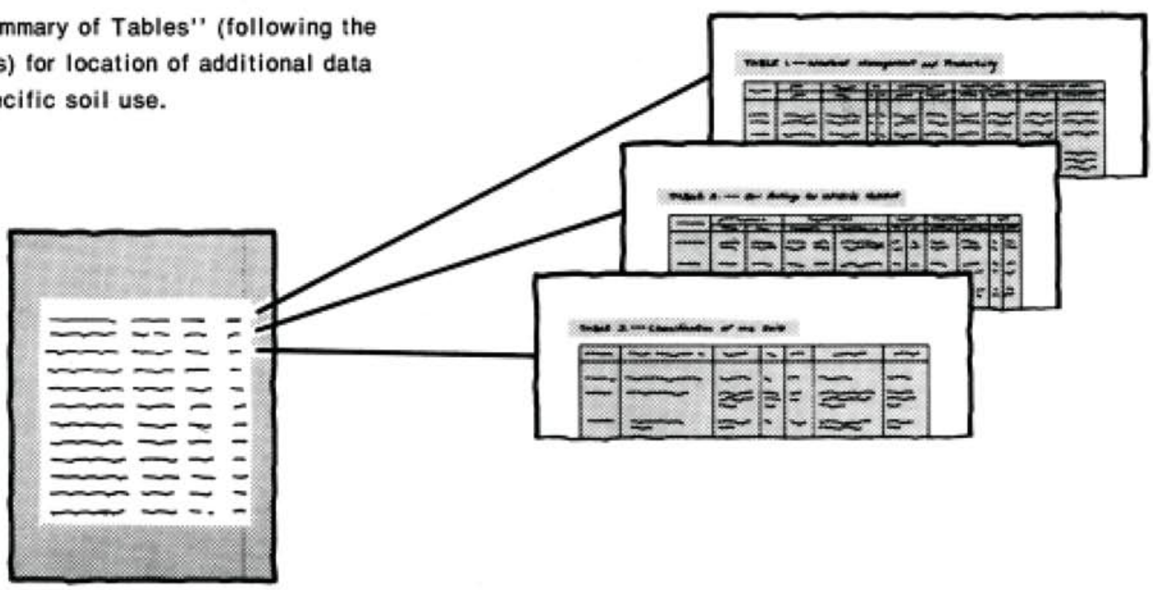


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was performed in the period 1970-1975. Soil names and descriptions were approved in 1976. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1976. This survey was made cooperatively by the Soil Conservation Service and the Illinois Agricultural Experiment Station. It is part of the technical assistance furnished to the Winnebago and Boone Counties Soil and Water Conservation Districts. Cost of the survey was shared by the Boards of Supervisors of Winnebago and Boone Counties.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

This soil survey is Illinois Agricultural Experiment Station Soil Report No. 107

Cover: Contour stripcropping and no-tillage planting in an area of Edmund silt loam, 9 to 15 percent slopes, eroded.

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Issued March 1980

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Summary of tables

Summary of tables—Continued

Foreword

This soil survey contains information that can be used in land-planning programs in Winnebago and Boone Counties. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

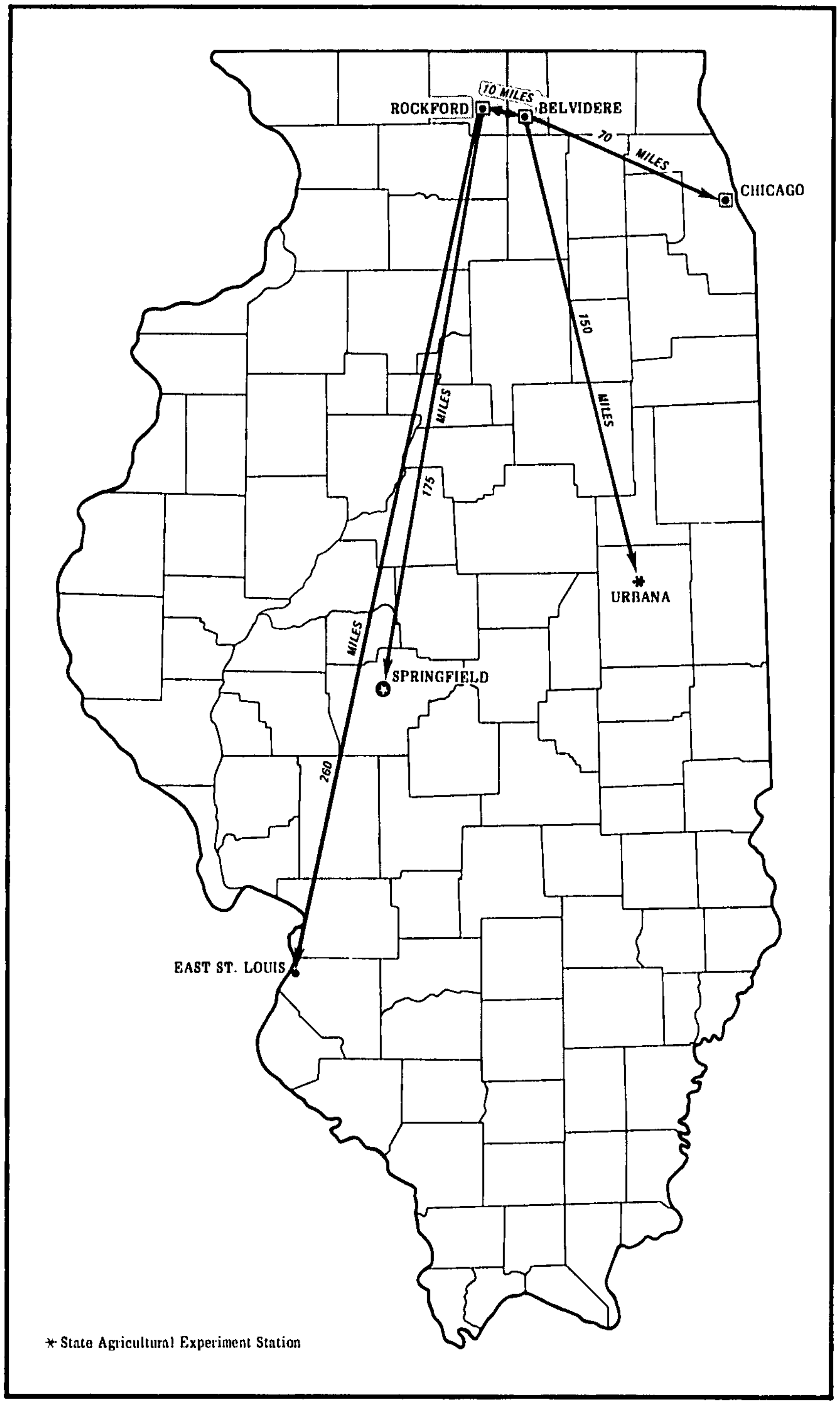
This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Warren J. Fitzgerald

Warren J. Fitzgerald
State Conservationist
Soil Conservation Service



Location of Winnebago and Boone Counties in Illinois

soil survey
of

Winnebago and Boone Counties, Illinois

By D.R. Grantham,
Soil Conservation Service

Fieldwork by D.R. Grantham, S.K. Higgins, M.R. LaVan, H.R. Mount, J.A. Thompson, and S.E. Zwicker, Soil Conservation Service

United States Department of Agriculture
Soil Conservation Service
in cooperation with
Illinois Agricultural Experiment Station

WINNEBAGO and BOONE COUNTIES are in the north-central part of Illinois. They occupy 513,920 acres, or 803 square miles. In 1970, according to the Census of that year, the survey area had a population of 272,063. Rockford, the county seat of Winnebago County, is the largest metropolitan area. In 1970 it had a population of 147,370. It is located about 80 miles from Chicago, 175 miles from Springfield, and 260 miles from East St. Louis.

The Rock River bisects the survey area from north to south. All other major streams in the counties are tributaries of the Rock River.

The physiographic features of the survey area have been greatly influenced by the advance and retreat of glaciers. The glaciers gouged the limestone ridges and diverted streams, thus carving deep channels in the bedrock. Till plains that have drumlins, eskers, and kames are scattered throughout the survey area. Two prominent end moraines of the Wisconsin glaciation are the Harrisville Moraine, located southeast of Cherry Valley in Winnebago County, and a north-south trending ridge at Capron in Boone County. These moraines are unique to the area.

The relief of Winnebago County is characterized by broad, rolling glaciated uplands that rise 100 to 200 feet above the valleys. Most upland soils formed in a thin layer of loess and the underlying glacial drift. Limestone bedrock is near the surface throughout most of the county, and bedrock outcrops are numerous, especially in the northwestern part of the county.

In Boone County, the relief is not so pronounced as that in Winnebago County. More than 60 percent of the soils are wet most of the time. The glacial drift is much thicker than in Winnebago County, and bedrock outcrops are few.

Elevation ranges from about 680 feet in the south-central part of the survey area to 1,048 feet in the northeastern part.

Manufacturing and agriculture are the main enterprises in the survey area. Agriculture is important to the economy of the two counties, despite the expansion of urban development. In Winnebago County, cash-grain and livestock farms predominate, and they are about equal in number. In Boone County, cash-grain farms are much more numerous than livestock farms. In some areas, in both counties, specialty crops such as peas and sweet corn are grown.

General nature of the survey area

This section provides general information about Winnebago and Boone Counties. The settlement of the survey area and the natural resources, climate, industry, and farming in the area are discussed.

Settlement

The survey area was opened to settlement in 1832. In 1834, Winnebago County was founded by settlers from New England. The original boundaries of the county included Boone County and part of Stephenson County. In 1939, the county seat was moved from the village of Winnebago to Rockford. By 1840, Winnebago County had a population of 4,609.

In 1835, Boone County was founded by settlers from New York. It was named in honor of Colonel Daniel Boone. By 1840, Boone County had a population of 1,705.

Transportation

The Northwest Tollway (I-90) connects the two counties in the survey area; on the tollway, Wisconsin is to the north and Chicago to the east. U.S. 20 and Bypass 20 connect Belvidere with Rockford and points east and west. U.S. 51 and State Highway 2 run north and south through Winnebago County, and State Highway 76 runs north and south through Boone County. In addition, four major railroads, one municipal airport and three private airports, and one bus line serve the area.

Natural resources

Soil is the most important natural resource in the survey area. The soils in the survey area are used mainly for agriculture. Marketable farm products include meat, milk, eggs, and feed grains.

The water supply in the survey area is good. The deep glacial outwash and underlying Cambrian aquifers of the Rock and Kishwaukee River Valleys are the main sources of water for the larger industries and municipalities. They are capable of supplying much more water than is currently used. The sandstone aquifers of Ordovician age supply water to the smaller industries and cities. The shallow dolomitic limestone aquifers in the uplands supply water for domestic and livestock use.

One of the largest deposits of sand and gravel in Illinois is the Rock River Terrace, located between South Beloit and Rockford. The deposits in this area average more than 200 feet in thickness and have been extensively developed. The sand and gravel are used in commercial building and paving and as fill material.

Limestone is an important resource in the survey area. In 1972, there were 21 active limestone quarries in Winnebago County and 3 active quarries in Boone County. These quarries produce crushed and broken stone that is used mainly as base material for roads, for road surfacing, as agricultural lime, and as concrete aggregate (*3*).

Industry

There are more than 600 manufacturing firms in the survey area, mostly machine tool and metal fabrication companies. Rockford is the world's largest producer of screws and fastener products, and it is the nation's second largest machine tool center. A large auto assembly plant is located in the Belvidere area. Scales, containers, hand tools, cans, electric motors, precision machinery, pet foods, pumps, wire goods, paints, plastics, aviation instruments, and many other items also are produced in the survey area.

Farming

Agriculture is important to the economy of the survey area. About 353,904 acres, or 69 percent, of the survey area is cropland; 33,500 acres, or 7 percent, is pasture; and 18,600 acres, or 4 percent, is woodland (*4*).

In 1973, according to the Illinois Cooperative Crop Reporting Service, the acreage in corn was 92,300 acres in Winnebago County and 63,700 acres in Boone County. It has not changed significantly during the past 10 years.

The acreage in soybeans increased dramatically between 1965 and 1973. In Winnebago County, there were 19,500 acres in soybeans in 1965 and 38,900 acres in 1973. In Boone County, the acreage in soybeans increased from 14,500 acres in 1965 to 35,900 acres in 1973.

The acreage in oats has declined steadily since 1945. In Winnebago County, there were 56,000 acres in oats in 1945 and 13,400 acres in 1973. In Boone County, the acreage in oats decreased from 36,200 acres in 1945 to 7,600 acres in 1973.

The acreage in hay crops has declined steadily since 1955. In Winnebago County, there were 43,300 acres in hay in 1955 and 19,900 acres in 1973. In Boone County, the acreage in hay decreased from 28,100 acres in 1955 to 14,400 acres in 1973.

According to the Illinois Cooperative Crop Reporting Service, the number of beef cows in Winnebago County increased from 2,100 in 1950 to 7,300 in 1974. In Boone County, it increased from 600 head in 1950 to 2,000 head in 1974.

In Winnebago County, the number of milk cows, including all cows and heifers 2 years of age and older, decreased from 20,800 in 1950 to 8,600 in 1974. In Boone County, the number of milk cows decreased from 20,000 in 1950 to 8,000 in 1974.

The number of hogs in Winnebago County was 66,900 in 1950, 86,600 in 1960, and 66,400 in 1973. In Boone County, there were 28,700 hogs in 1950, 41,100 in 1960, and 28,700 in 1973.

The number of stock sheep in Winnebago County was 4,900 in 1950, 7,400 in 1960, and 3,000 in 1973. In

Boone County, stock sheep numbered 1,500 in 1950, 3,700 in 1960, and 1,500 in 1973.

The number of laying chickens in Winnebago County decreased from 95,000 in 1965 to 22,600 in 1972. In Boone County, the number of laying chickens decreased from 32,000 in 1965 to 11,800 in 1972.

In 1969, according to the U.S. Census of Agriculture, 239,335 acres, or about 72 percent, in Winnebago County was in farms. Of the 1,184 farms in Winnebago County, 306 were livestock farms, 303 were cashgrain farms, 247 were dairy farms, and the rest were poultry farms or other general farms. The average size of the farms was 202 acres.

In Boone County, 161,788 acres, or 89 percent of the county, was in farms. Of the 701 farms in Boone County, 226 were livestock farms. The rest were poultry farms or general farms. The average size of the farms was 231 acres.

Climate

Prepared by the National Climatic Center, Asheville, North Carolina.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Rockford, Illinois, in the period 1951 to 1974. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 23 degrees F, and the average daily minimum temperature is 15 degrees. The lowest temperature on record, which occurred at Rockford on January 21, 1970, is -22 degrees. In summer the average temperature is 71 degrees, and the average daily maximum temperature is 82 degrees. The highest recorded temperature, which occurred on July 27, 1955, is 103 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 38 inches. Of this, 25 inches, or 66 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 20 inches. The heaviest 1-day rainfall during the period of record was 5.56 inches at Rockford on September 13, 1961. Thunderstorms occur on about 42 days each year, and most occur in summer.

Average seasonal snowfall is 33 inches. The greatest snow depth at any one time during the period of record was 14 inches. On an average of 22 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 83 percent. The prevailing wind is from the west-northwest. Average windspeed is highest, 12 miles per hour, in April.

How this survey was made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and the kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed very little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby counties and in more distant places. They classified and named the soils according to nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "General soil map for broad land use planning" and "Soil maps for detailed planning."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for engineering tests. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it can be used by farmers, woodland managers, engineers, planners, developers and builders, home buyers, and others.

General soil map for broad land use planning

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The general soil map for Winnebago and Boone Counties joins with the general soil maps for Ogle, DeKalb, Stephenson, and McHenry Counties in Illinois and Rock, Green, and Walworth Counties in Wisconsin. In places, the names of map units do not agree across county and state lines because the extent of the major soils in the map units is different or because of conceptual changes that resulted from changes in soil classification. The soils or the parent material in these map units is similar, and the soils have similar potentials. The differences in the map unit names do not significantly affect the use of these maps for general planning.

Descriptions of map units

Areas dominated by nearly level to strongly sloping soils that formed in loess and glacial deposits; on uplands

This group consists of 6 map units on glaciated uplands in the survey area. The map units are characterized by knolls, ridges, and mounds and have variable slopes. Areas of small, narrow flood plains that extend into the uplands are included in these map units.

1. Tama-Ogle-Plano

Deep, well drained, nearly level to sloping soils that formed in loess or in loess and the underlying glacial deposits; on uplands

This map unit consists of nearly level to sloping soils on convex ridges and side slopes on glaciated uplands. This unit makes up about 15 percent of the survey area. It is about 20 percent Tama soils, 15 percent Ogle soils, 15 percent Plano soils, and 50 percent minor soils (fig. 1).

Tama soils are well drained, nearly level to sloping soils on convex ridges and side slopes. Typically, the surface layer is very dark gray and very dark grayish brown silt loam about 13 inches thick. The subsoil is brown, dark yellowish brown, and yellowish brown silty clay loam. It is underlain, at a depth of about 49 inches, by brown and yellowish brown silt loam.

Ogle soils are well drained and gently sloping. In areas where these soils are on upland till plains, they are in more convex positions on the landscape than Tama and Plano soils. Typically, the surface layer is very dark grayish brown silt loam about 12 inches thick. The upper part of the subsoil is dark yellowish brown silty clay loam, and the lower part is brown to reddish brown loam or clay loam. The subsoil extends to a depth of more than 5 feet.

Plano soils are well drained, nearly level to sloping soils on convex ridges and side slopes. Typically, the surface layer is black silt loam about 20 inches thick. The upper part of the subsoil is dark brown silty clay loam, and the lower part is dark yellowish brown sandy loam. The subsoil is underlain, at a depth of 61 inches, by brown sandy loam.

The minor soils are Sable, Muscatine, Elburn, and Downs soils. Sable soils are poorly drained and are in depressions. Muscatine soils are somewhat poorly drained. They are on foot slopes near Tama soils. Downs soils are well drained and are nearly level or gently sloping. They are near Tama soils in areas where the dark colored surface layer is not so thick.

This unit is used for cultivated crops, small grains, and legumes. The main concerns of management are controlling erosion and maintaining tilth and fertility. The main agricultural enterprises are growing cash crops, dairy farming, and feeding livestock.

This unit has good potential for cultivated crops, for most recreation uses, and for residential and other urban uses.

2. Varna-Andres

Deep, moderately well drained and somewhat poorly drained, nearly level and gently sloping soils that formed in loess and the underlying glacial till; on uplands

This map unit consists of soils on till plains that have relatively little relief. The slopes generally are convex and short. This unit makes up about 1 percent of the survey area. It is about 30 percent Varna soils, 20 percent Andres soils, and 50 percent minor soils (fig. 2).

Varna soils are moderately well drained, gently sloping soils on convex ridges and side slopes. Typically, the surface layer is very dark grayish brown silt loam about 10 inches thick. The subsoil is brown silty clay loam. It is underlain, at a depth of about 35 inches, by grayish brown and yellowish brown, strongly calcareous silty clay loam.

Andres soils are nearly level and somewhat poorly drained. Typically, the surface layer is black and very

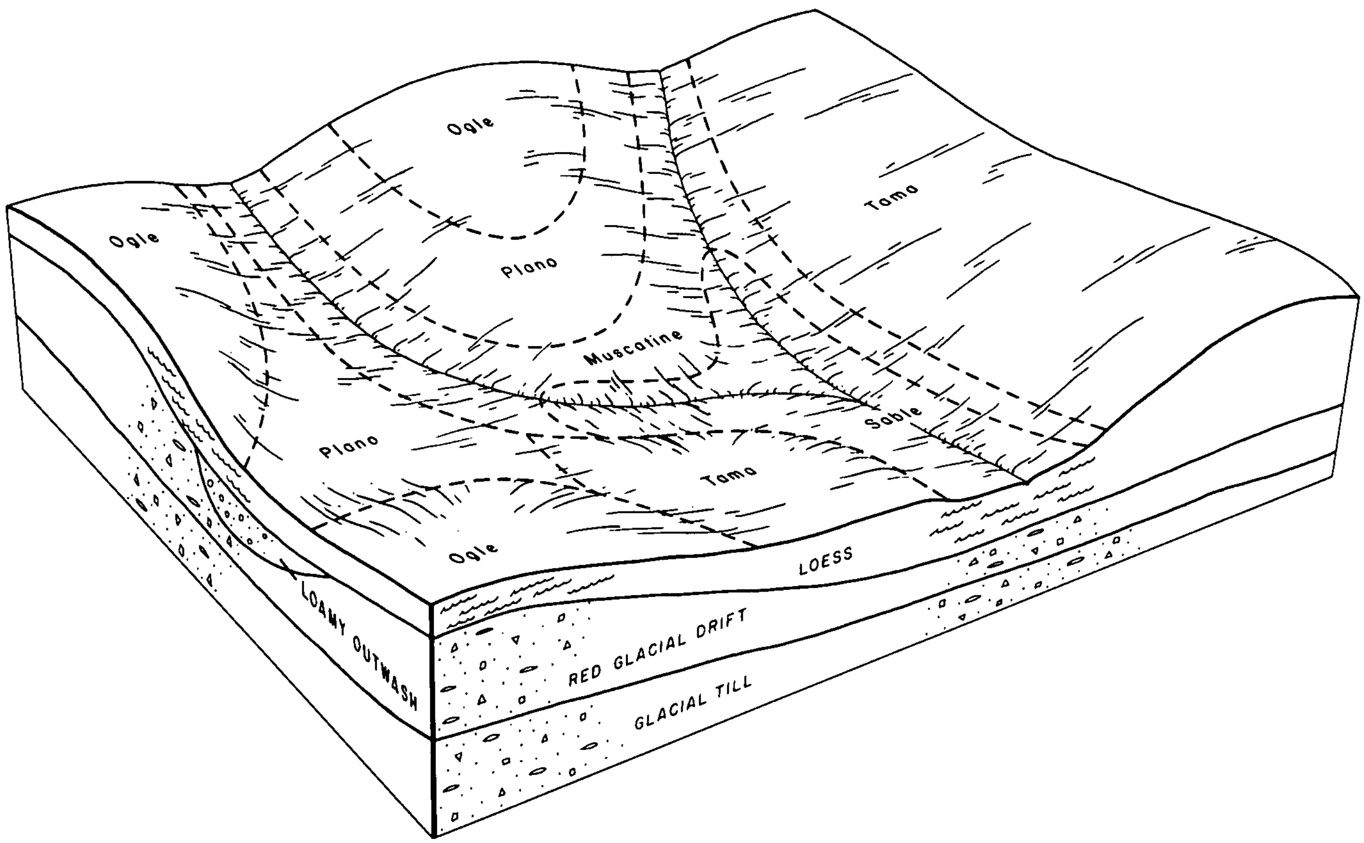


Figure 1.—Typical pattern of soils and parent material in the Tama-Ogle-Plano map unit.

dark gray silt loam about 17 inches thick. The subsoil is grayish brown, yellowish brown, and light brownish gray silty clay loam and clay loam. It is underlain, at a depth of about 30 inches, by light brownish gray and yellowish brown, strongly calcareous silty clay loam.

The minor soils are Elliott, Drummer, and Selma soils. Drummer soils are poorly drained and are nearly level or are in depressions. They are included in areas of poorly drained Selma soils. Elliott soils are nearly level and somewhat poorly drained. They are in areas downslope from Varna soils.

This map unit is used for cultivated crops, small grains, and legumes. The main concerns of management are improving drainage and controlling erosion. The main agricultural enterprises are growing cash crops, dairy farming, and feeding livestock.

3. Parr-Drummer

Deep, well drained and poorly drained, nearly level to sloping soils that formed in loess and the underlying glacial till or outwash; on uplands

This map unit consists of nearly level to sloping soils on till plains in the extreme eastern and southern parts of Boone County. This unit makes up about 10 percent of the survey area. It is about 35 percent Drummer soils, 20 percent Parr soils, and 45 percent minor soils.

Drummer soils are poorly drained and are nearly level or are in depressions. Typically, the surface layer is black and very dark gray silty clay loam about 19 inches thick. The upper part of the subsoil is olive gray silty clay loam and silt loam, and the lower part is olive gray loam. The underlying material, at a depth of about 48 inches, is olive gray and yellowish brown sandy loam.

Parr soils are well drained, gently sloping and sloping soils on convex ridges and side slopes. Typically, the surface layer is very dark gray and very dark grayish brown silt loam about 19 inches thick. The subsoil is dark yellowish brown and brown clay loam. It is underlain, at a depth of about 36 inches, by light yellowish brown, strongly calcareous loam.

The minor soils are Herbert, Lisbon, Elburn, Saybrook, Selma, Odell, and Jasper soils. Herbert soils are nearly level and somewhat poorly drained; they are downslope from Parr soils. Saybrook soils are in positions on the

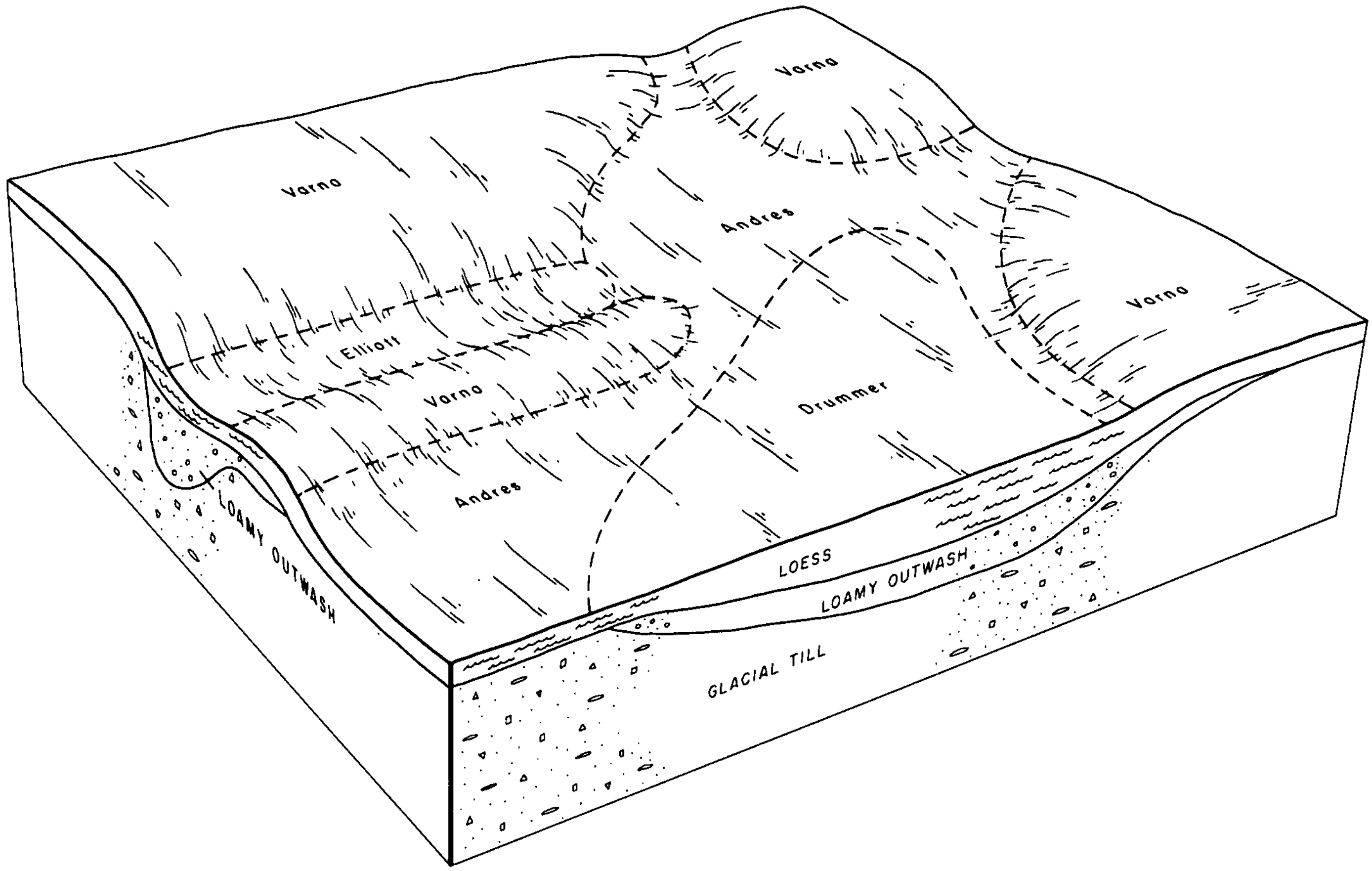


Figure 2.—Typical pattern of soils and parent material in the Varna-Andres map unit.

landscape similar to those of Parr soils; they formed in loess 20 to 40 inches thick and the underlying calcareous loam glacial till. Selma soils are poorly drained and are nearly level or are in depressions along intermittent and perennial streams. Odell soils are nearly level and somewhat poorly drained. They are on foot slopes near Parr soils. Jasper soils are well drained; they formed in loess and the underlying glacial outwash and are in positions on the landscape similar to those of Parr soils.

This unit is used mainly for cultivated crops, small grains, and legumes. The main concerns of management are improving drainage and controlling erosion. The main agricultural enterprises are growing cash crops, dairy farming, and feeding livestock.

This unit has good potential for cultivated crops. It has good to fair potential for recreation uses and for residential and other urban uses.

4. Flagg-Pecatonica

Deep, well drained, nearly level to sloping soils that formed in loess and the underlying glacial drift; on uplands

This map unit consists of soils on convex ridges and side slopes on uplands. In northern Boone County, the soils in this unit generally are more gently sloping than those in Winnebago County. This unit makes up about 19 percent of the survey area. It is about 25 percent Flagg soils, 20 percent Pecatonica soils, and 55 percent minor soils.

Flagg soils are well drained, nearly level to sloping soils on upland till plains. Typically, the surface layer is dark grayish brown silt loam about 7 inches thick. The upper part of the subsoil is brown silt loam and yellowish brown silty clay loam, and the lower part is brown clay loam and extends to a depth of more than 60 inches.

Pecatonica soils are well drained, gently sloping and sloping soils on upland till plains. Typically, the surface layer is very dark brown silt loam about 3 inches thick. The subsurface layer is grayish brown and light yellowish brown silt loam about 9 inches thick. The upper part of

the subsoil is dark yellowish brown and dark brown silt loam and loam, and the lower part is red and dark reddish brown sandy clay loam and dark brown sandy loam and extends to a depth of more than 60 inches.

The minor soils are Sable, Fayette, St. Charles, Kidder, McHenry, Kendall, and Stronghurst soils. Sable soils are poorly drained and are in large concave depressions on uplands in northern Boone County. They have a dark-colored surface layer. Fayette soils are well drained and are in positions similar to those of Flagg soils. St. Charles soils are well drained or moderately well drained and are near Flagg soils. Kidder soils are well drained and are near major stream valleys. McHenry soils are well drained or moderately well drained and are near Pecatonica soils. Kendall and Stronghurst soils are nearly level and somewhat poorly drained. They are downslope from Flagg soils.

This unit is used mainly for cultivated crops, small grains, and legumes. In some areas, the sloping soils in this unit are used as pasture and woodland. The main concerns of management are controlling erosion and maintaining fertility. The main agricultural enterprises are growing cash crops, dairy farming, and feeding livestock.

The nearly level or gently sloping soils in this map unit have good potential for cultivated crops, and the sloping soils have fair potential. This unit has good to fair potential for most recreation uses and for residential and other urban uses.

5. Miami-Kendall

Deep, well drained and somewhat poorly drained, nearly level to sloping soils that formed in thin loess and the underlying glacial till or in glacial outwash; on uplands

This map unit consists of soils in small, nearly level drainageways and on dissected side slopes in the extreme eastern and southern parts of Boone County. It makes up about 1 percent of the survey area. It is about 30 percent Miami soils, 30 percent Kendall soils, and 40 percent minor soils.

Miami soils are well drained, gently sloping and sloping soils on upland till plains. Typically, the surface layer is dark grayish brown silt loam about 7 inches thick. The upper part of the subsoil is brown silty clay loam, and the lower part is brown, reddish brown, and yellowish red clay loam. The underlying material, at a depth of about 33 inches, is brown, strongly calcareous loam.

Kendall soils are somewhat poorly drained, mainly nearly level soils in drainageways. The surface layer is dark grayish brown silt loam about 9 inches thick. The subsurface layer is grayish brown silt loam 3 inches thick. The upper part of the subsoil is grayish brown and yellowish brown silty clay loam and silt loam, and the lower part is yellowish brown and gray silt loam that has a noticeable amount of sand. It is underlain, at a depth of about 53 inches, by yellowish brown and grayish brown sandy loam.

The minor soils are Martinsville, Pecatonica, Herbert, and Drummer soils. Martinsville soils are well drained and are near Kendall soils. Petcatonica soils are well drained and are near Miami soils. Herbert soils are nearly level and somewhat poorly drained and are near Kendall soils. Drummer soils are poorly drained and are in depressions or small, nearly level drainageways that extend into the unit.

This unit is used mainly for cultivated crops. In some areas, the soils are used as permanent pasture and for timber production. The main concerns of management are improving drainage, maintaining fertility, and controlling erosion. The main agricultural enterprises are growing cash crops, dairy farming, and feeding livestock.

This unit has good to fair potential for cultivated crops. The well drained, less sloping soils in this unit have good potential for most recreation uses and for urban uses; and the somewhat poorly drained, sloping soils have fair to poor potential for these uses.

6. Griswold-Winnebago

Deep, well drained, gently sloping to strongly sloping soils that formed in glacial till or in thin loess and the underlying glacial drift; on uplands

This map unit consists of gently sloping to strongly sloping soils on dissected side slopes and irregular ridges. Slopes are more prominent along small drainageways. This unit makes up about 17 percent of the survey area. It is about 25 percent Griswold soils, 15 percent Winnebago soils, and 60 percent minor soils.

Griswold soils are well drained, gently sloping to strongly sloping soils on upland side slopes. Typically, the surface layer is very dark grayish brown and dark brown sandy loam about 15 inches thick. The upper part of the subsoil is brown sandy loam, the middle part is brown loam, and the lower part is dark yellowish brown, gravelly sandy loam. It is underlain by light yellowish brown, strongly calcareous sandy loam at a depth of about 36 inches. In Burritt and Owen Townships in Winnebago County, Griswold soils have a surface layer that is very dark grayish brown loam about 14 inches thick.

Winnebago soils are well drained, gently sloping to strongly sloping soils on upland side slopes and ridges. Typically, the surface layer is very dark grayish brown and dark brown silt loam about 15 inches thick. The upper part of the subsoil is brown and reddish brown loam and clay loam. The lower part is reddish brown sandy loam and generally extends to a depth of more than 60 inches. The surface layer of Winnebago soils on the east side of Rock River generally is very dark grayish brown sandy loam.

The minor soils are Selma, Jasper, Grellton, La Hogue, Rockton, and Dodgeville soils. Selma soils are poorly drained and nearly level; La Hogue soils are somewhat poorly drained and nearly level. Selma and La Hogue soils are in narrow, concave areas that extend into the

map unit from major stream valleys. Jasper soils are well drained and are near Griswold soils. Friesland soils are well drained or moderately well drained and are in an intricate pattern near Griswold soils. Grellton soils are well drained or moderately well drained, gently sloping and sloping soils in and around areas of Griswold soils.

Rockton and Dodgeville soils are well drained and are near Winnebago soils in areas where dolomitic bedrock is near the surface.

This unit is used mainly for cultivated crops, small grains, and legumes. In a few areas, the soils are used as permanent pasture. The main concerns of management are improving fertility and controlling water erosion. The main agricultural enterprises are growing cash crops, dairy farming, and feeding livestock.

This map unit has good to fair potential for cultivated crops. The less sloping soils in this unit have good potential for most recreation uses and for residential or other urban uses, and the sloping or strongly sloping soils have fair to poor potential for these uses.

Areas dominated by gently sloping to strongly sloping soils that formed in loess, windblown sand, glacial drift, or residuum of dolomite; on uplands

This group consists of 2 map units on uplands in areas where glacial deposits are few. These units are characterized by long convex ridges and side slopes that are separated by small intermittent streams and by drainageways.

7. Edmund-Chelsea-Winnebago

Shallow and deep, well drained and excessively drained, gently sloping to strongly sloping soils that formed in loess and the underlying residuum of dolomite, in windblown sand, and in thin loess and the underlying glacial drift; on uplands

This map unit consists of gently sloping to strongly sloping soils on irregular slopes on uplands in Shirland Township in Winnebago County. This unit makes up about 2 percent of the survey area. It is about 30 percent Edmund soils, 15 percent Chelsea soils, 10 percent Winnebago soils, and 45 percent minor soils (fig. 3).

Edmund soils are well drained, gently sloping to strongly sloping soils on ridges and convex side slopes. Typically, the surface layer is very dark gray silt loam about 7 inches thick. The upper part of the subsoil is very dark grayish brown silty clay loam, and the lower part is dark brown silty clay loam. Pale yellow and yellow, calcareous dolomitic bedrock is at a depth of about 15 inches.

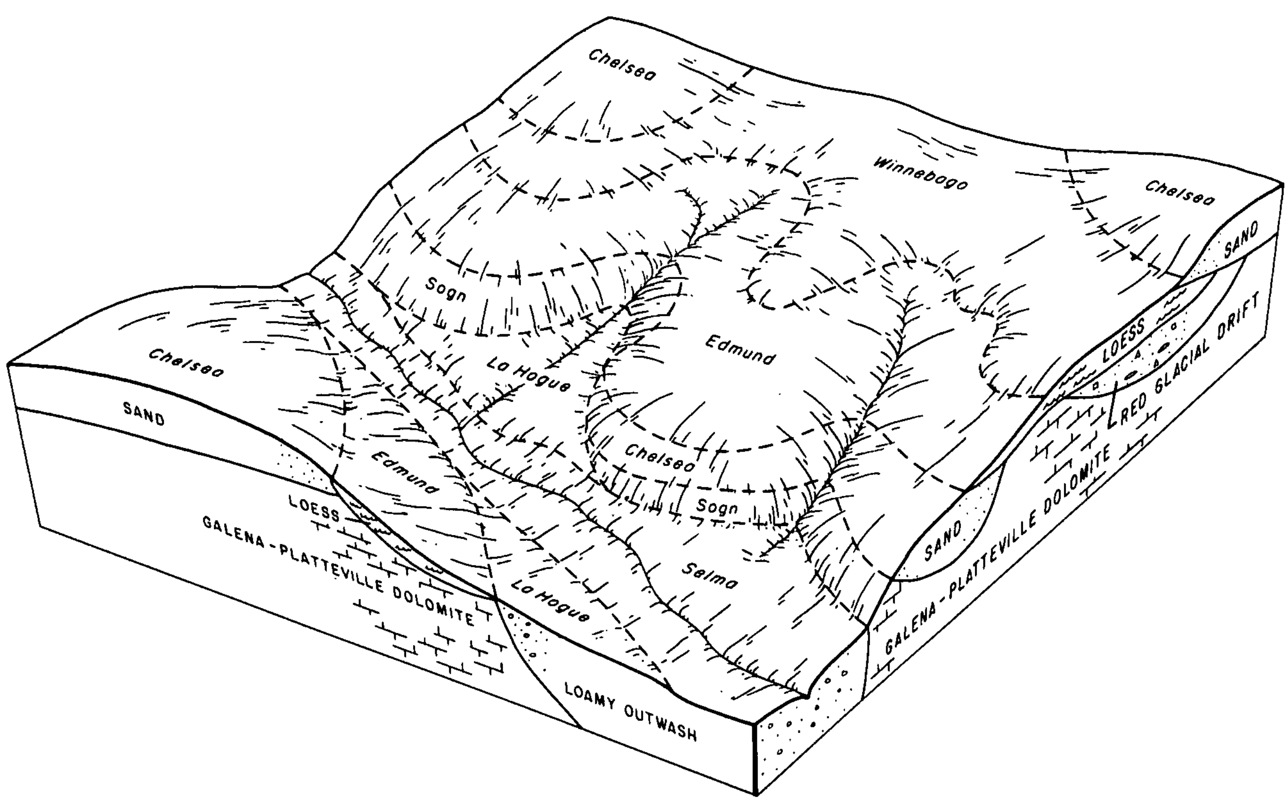


Figure 3.—Typical pattern of soils and parent material in the Edmund-Chelsea-Winnebago map unit.

Chelsea soils are excessively drained, gently sloping or sloping soils in areas of sandy dunes. Typically, the surface layer is very dark grayish brown loamy fine sand about 4 inches thick. The subsurface layer is brown loamy sand and yellowish brown loamy fine sand about 31 inches thick. The subsoil, which extends to a depth of 60 inches, consists of yellowish brown, loose sand that has thin bands of brown loamy sand and fine sandy loam. Chelsea soils are dominant in the western part of this map unit.

Winnebago soils are well drained, gently sloping to strongly sloping soils on upland side slopes and ridges. Typically, the surface layer is very dark grayish brown and dark brown silt loam about 15 inches thick. The upper part of the subsoil is brown and reddish brown loam and clay loam, and the lower part is reddish brown sandy loam. The subsoil commonly extends to a depth of more than 60 inches.

The minor soils are Dunbarton, Sogn, Backbone, Griswold, and Selma soils. Dunbarton soils are well drained, sloping to moderately steep soils that have a light-colored surface layer. They are near Edmund soils. Sogn soils are somewhat excessively drained, sloping to steep soils on ridges and side slopes in areas where dolomitic bedrock is near the surface. Backbone soils are well drained and are near Edmund and Chelsea soils. Griswold soils are well drained and are near Winnebago soils. Selma soils are poorly drained and are in drainageways that extend into this map unit.

This unit is used mainly for cultivated crops, small grains, and legumes. In some areas the soils are used for black oaks and as permanent pasture. In other areas, bedrock outcrops at the surface. The main concerns of management are the hazards of wind and water erosion and the shallowness of the Edmund soils to bedrock. The main agricultural enterprises are growing cash crops, dairy farming, and feeding livestock.

This unit has poor to good potential for cultivated crops. The soils in this unit that are shallow to bedrock and those that are strongly sloping have poor potential for most recreation uses and for residential and other urban uses, and the other soils have fair to good potential for these uses.

8. Ashdale-Rockton-Dodgeville

Moderately deep and deep, well drained, gently sloping to strongly sloping soils that formed in loess and the underlying residuum of dolomite and in glacial drift and the underlying residuum of dolomite; on uplands

This map unit consists of gently sloping to strongly sloping soils on incised side slopes and ridges in Durand Township in Winnebago County. This unit makes up about 2 percent of the survey area. It is about 20 percent Ashdale soils, 15 percent Rockton soils, 15 percent Dodgeville soils, and 50 percent minor soils (fig. 4).

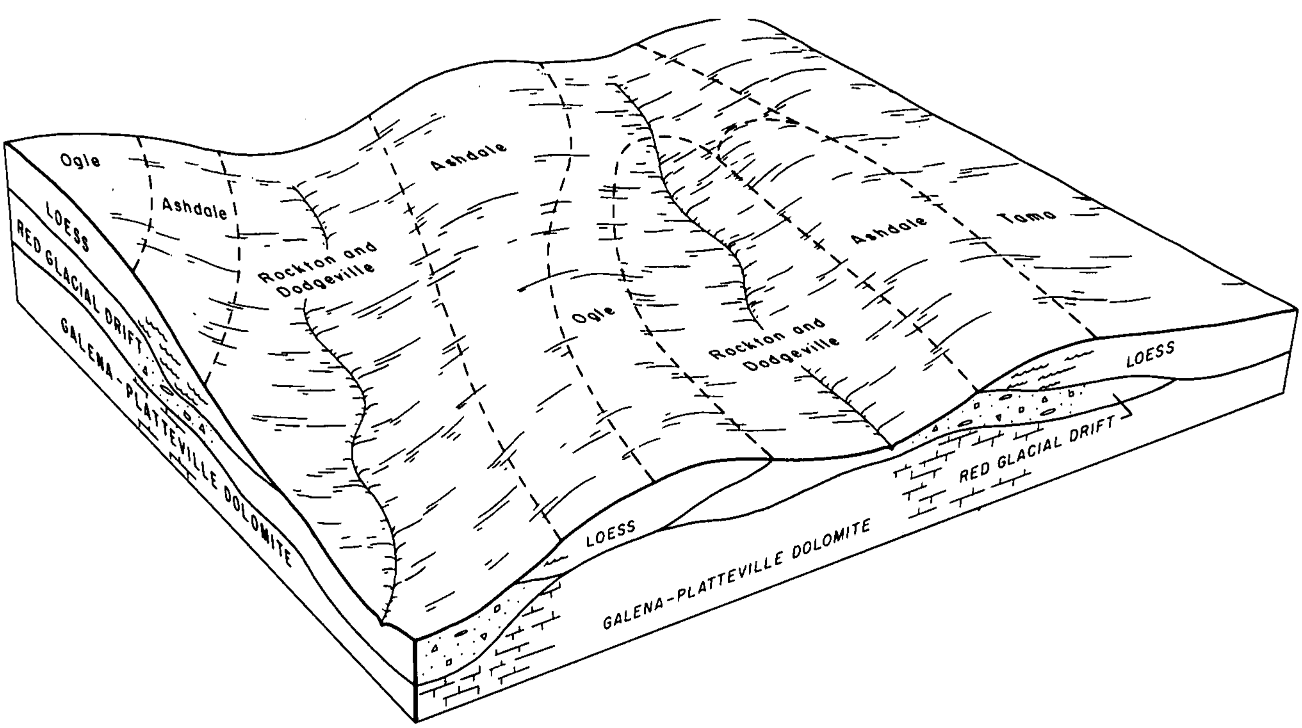


Figure 4.—Typical pattern of soils and parent material in the Ashdale-Rockton-Dodgeville map unit.

Ashdale soils are well drained, gently sloping to sloping soils on convex ridgetops and side slopes. Typically, the surface layer is very dark brown and dark brown silt loam about 14 inches thick. The upper part of the subsoil is brown and yellowish brown silty clay loam, and the lower part is reddish brown and dark brown silty clay. Brownish yellow, slightly calcareous dolomitic bedrock is at a depth of about 45 inches.

Rockton and Dodgeville soils are well drained, gently sloping to sloping soils on bedrock-controlled upland side slopes. Typically, the surface layer of these soils is very dark gray silt loam or loam. The subsoil is brown to dark reddish brown clay loam, silty clay loam, or clay. The subsoil of Rockton soils typically is more sandy than that of Dodgeville soils; and the lower part of the subsoil, which is reddish colored, is thicker in Dodgeville soils than in Rockton soils. These soils have olive yellow, calcareous dolomitic bedrock at a depth between 20 and 40 inches.

The minor soils are Ogle, Tama, Downs, and Argyle soils. Ogle soils are well drained and are on ridgetops; they are near Ashdale soils. Tama soils are well drained and are on ridgetops and side slopes; they are near Ashdale soils. Downs soils are well drained and are on ridgetops; they have a dark-colored surface layer thinner than that of Ashdale soils. Argyle soils are well drained and are on convex side slopes; they are near Rockton and Dodgeville soils.

This unit is used mainly for cultivated crops, small grains, and legumes. In some areas, the soils are used as permanent pasture. Some bedrock quarries are in this unit; and in a few small areas, bedrock outcrops at the surface. The main concerns of management are the hazard of water erosion and the moderate depth to bedrock of Rockton and Dodgeville soils. The main agricultural enterprises are growing cash crops, dairy farming, and feeding livestock.

This unit has good to fair potential for cultivated crops. It has poor to fair potential for most recreation uses and for residential and other urban uses.

Areas dominated by gently sloping to moderately steep soils that formed in loess or in loess and the underlying residuum of dolomite; on uplands

This group consists of 2 map units that are on bedrock-controlled uplands. These units are characterized by long, convex slopes on the sides of ridges, which are separated by small flood plains.

9. Fayette-Palsgrove

Deep, well drained, gently sloping and sloping soils that formed in loess and in loess and the underlying residuum of dolomite; on uplands

This map unit consists of soils on convex upland ridges and side slopes in Pecatonica and Harrison Townships, north of the Pecatonica River. This unit makes up about 5 percent of the survey area. It is about 30 percent Fayette soils, 15 percent Palsgrove soils, and 55 percent minor soils (fig. 5).

Fayette soils are well drained, gently sloping and sloping soils on ridges and side slopes. Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsurface layer is grayish brown silt loam about 3 inches thick. The upper part of the subsoil is yellowish brown silty clay loam, and the lower part is yellowish brown silt loam. The subsoil is underlain, at a depth of about 57 inches, by yellowish brown silt loam.

Palsgrove soils are well drained, gently sloping and sloping soils on ridgetops and convex side slopes. Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsurface layer is dark grayish brown silt loam 4 inches thick. The upper part of the subsoil is brown silty clay loam, and the lower part is dark reddish brown silty clay. Very pale brown, slightly calcareous dolomitic bedrock is at a depth of about 55 inches.

The minor soils are Rozetta, Flagg, Whalan, and NewGlarus soils. Rozetta soils are moderately well drained, nearly level soils on terrace remnants; they are near Fayette soils. Flagg soils are well drained and are nearly level to sloping; they are near Palsgrove soils. Whalan and NewGlarus soils are well drained, are gently sloping to strongly sloping, and are in areas where dolomitic bedrock is at a depth of less than 40 inches; they are near Palsgrove soils.

This unit is used mainly for small grains, legumes, and cultivated crops. In a few areas, it is in pasture and native hardwoods. The main concerns of management are controlling water erosion and improving fertility. The main agricultural enterprises are growing cash crops, dairy farming, and feeding livestock.

This unit has good to fair potential for cultivated crops. The main limitations are the steepness of slopes and the hazard of erosion. The soils in this unit that are sloping and that have bedrock near the surface have fair potential for residential and most other urban uses, and the soils that are less sloping and that do not have bedrock near the surface have good potential for these uses.

10. Whalan-NewGlarus-Dunbarton

Moderately deep and shallow, well drained, gently sloping to moderately steep soils that formed in loess and the underlying residuum of dolomite; on uplands

This map unit consists of soils on glaciated hills. Slopes are long. The topography is bedrock-controlled. Most areas of this unit are in the extreme northwestern part of Winnebago County; a small area is along the

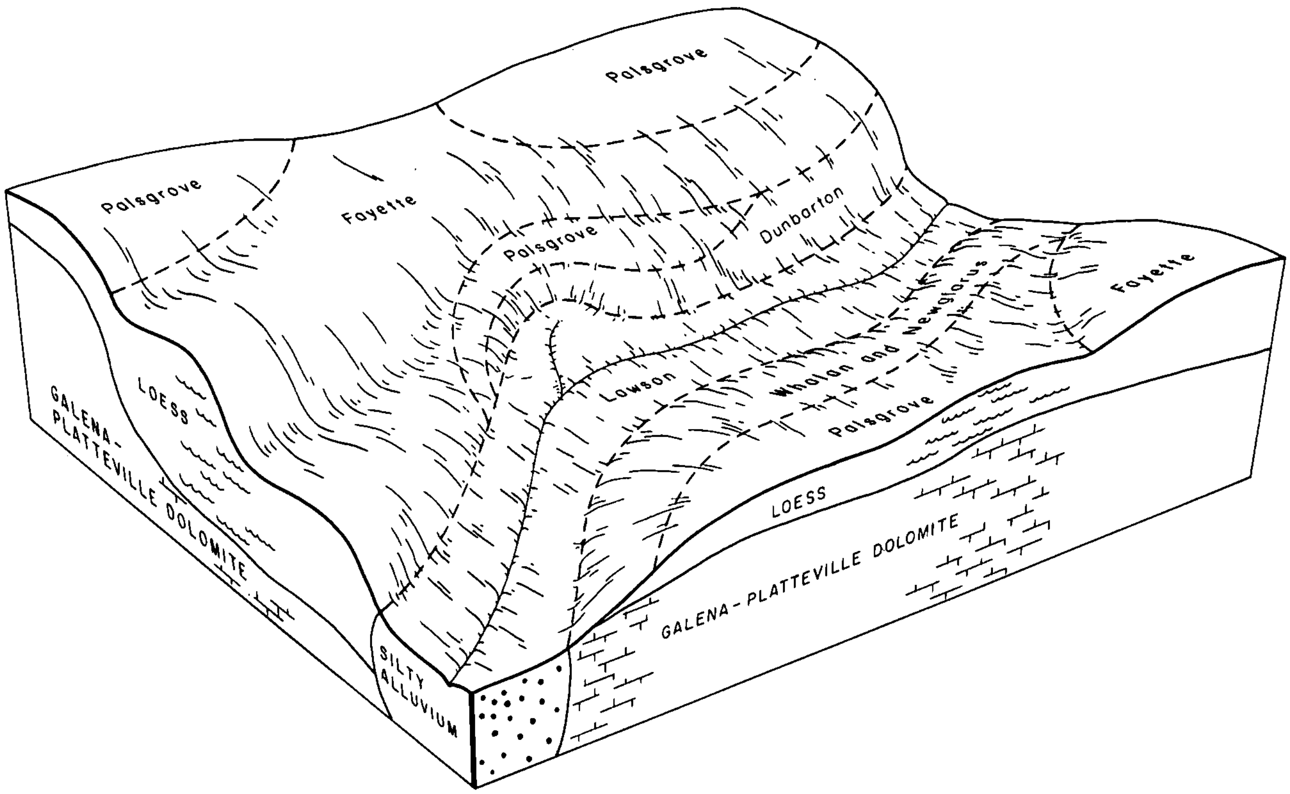


Figure 5.—Typical pattern of soils and parent material in the Fayette-Paisgrove map unit.

Kishwaukee River in Cherry Valley Township. This unit makes up 2 percent of the survey area. It is about 30 percent Whalan and NewGlarus soils, 15 percent Dunbarton soils, and 55 percent minor soils.

Whalan and NewGlarus soils are well drained, gently sloping to strongly sloping soils on upland side slopes. Typically, the surface layer of these soils is dark grayish brown silt loam. The subsoil is brown to reddish brown silty clay loam, clay loam, and clay. The subsoil of Whalan soils typically is more sandy than that of NewGlarus soils; the subsoil of NewGlarus soils, which is reddish brown, is thicker than that of Whalan soils. These soils have brownish yellow, slightly calcareous dolomitic bedrock at a depth between 20 and 40 inches.

Dunbarton soils are well drained, sloping to moderately steep soils on convex side slopes. The surface layer is dark grayish brown silt loam about 5 inches thick. The upper part of the subsoil is dark yellowish brown silty clay loam, the middle part is brown clay loam, and the lower part is dark reddish brown clay. Brownish yellow, slightly calcareous dolomitic sand and bedrock are at a depth of about 16 inches.

The minor soils are Flagg, Edmund, St. Charles, Orion, and Sogn soils. Flagg soils are well drained, nearly level to sloping, and are on ridgetops. Edmund soils are similar to Dunbarton soils except that they have a dark-colored surface layer. St. Charles soils are well drained and moderately well drained, nearly level to sloping soils on foot slopes and benches along small drainageways. Orion soils are somewhat poorly drained and nearly level and are in narrow alluvial streambeds that extend into the unit. Sogn soils are well drained, sloping to steep soils on small escarpments.

This map unit is used mainly for cultivated crops, small grains, and legumes. In some areas, the soils are used for timber production and as permanent pasture. In some areas, bedrock outcrops at the surface. Many small bedrock quarries are in this unit. The main concerns of management are improving fertility and controlling water erosion. The main agricultural enterprises are growing cash crops, dairy farming, and feeding livestock.

This map unit has poor to good potential for cultivated crops. The shallow and strongly sloping to moderately steep soils have poor potential for most recreation uses

and for residential and other urban uses, and the other soils in this unit have fair potential for these uses.

Areas dominated by nearly level to sloping soils that formed in alluvial and outwash sediment; on stream terraces and flood plains

This group consists of two map units that are on a broad landscape adjacent to the major streams in Winnebago and Boone Counties.

11. Flagler-Warsaw-Hononegah

Deep, well drained to excessively drained, nearly level to sloping soils that formed in loamy and sandy sediment underlain by sandy and gravelly sediment; on high stream terraces

This map unit consists of nearly level to sloping soils on stream terraces. This unit makes up about 13 percent of the survey area. It is about 10 percent Flagler soils, 10 percent Warsaw soils, 10 percent Hononegah soils, and 70 percent minor soils.

Flagler soils are nearly level and are on stream terraces of the Rock River Terrace and, to a lesser extent, the Kishwaukee River Terrace. Typically, the surface layer is black and very dark brown sandy loam about 23 inches thick. The upper part of the subsoil is brown sandy loam, and the lower part is brown and strong brown, very gravelly loamy sand and gravelly sand. The subsoil is underlain, at a depth of about 41 inches, by yellowish brown sand.

Warsaw soils are mainly on nearly level stream terraces and on gently sloping and sloping terrace breaks along the Rock and Kishwaukee Rivers. Typically, the surface layer is very dark gray and very dark grayish brown loam 22 inches thick. The subsoil is brown loam and dark reddish brown gravelly loam. It is underlain, at a depth of about 36 inches, by yellowish brown, strongly calcareous sand and gravel.

Hononegah soils are mainly nearly level to gently sloping and are on stream terraces. The surface layer is very dark brown and dark brown loamy coarse sand about 19 inches thick. The upper part of the subsoil is dark yellowish brown loamy coarse sand, and the lower part is dark yellowish brown, very gravelly loamy coarse sand. The subsoil is underlain, at a depth of about 31 inches, by yellowish brown, strongly calcareous, very gravelly loamy coarse sand.

The minor soils are Wea, Waupecan, Dakota, Jasper, and Rodman soils. Wea soils are well drained and are nearly level and gently sloping; they are near Warsaw soils. Waupecan soils are moderately well drained and well drained and are nearly level; they are in large areas on the northern side of the Kishwaukee Terrace and in most areas of the Piscasaw Terrace in Boone County. Dakota soils are well drained and are nearly level; they are in a large area south of the Kishwaukee Terrace in Flora and Belvidere Townships in Boone County. Jasper soils are well drained and are nearly level to sloping; they are near Warsaw soils. Rodman soils are excessively drained, sloping to moderately steep soils on gravelly terrace escarpments and on kames or eskers; they are near Warsaw soils and are mapped in a complex with those soils.

The soils in this map unit are used for cultivated crops, small grains, and legumes. In some areas in Boone County, the soils are used for truck crops. They are used for urban development in areas near Rockford, Roscoe, Rockton, South Beloit, New Milford, Belvidere, and Garden Prairie. Tree plantings that are used to control wind erosion are common in the sand prairie area in Rockton Township. The main agricultural enterprises are growing cash crops, dairy farming, and feeding livestock.

This unit has poor to good potential for cultivated crops. Areas dominated by Warsaw soils have fair to good potential for cultivated crops, and areas dominated by Flagler or Hononegah soils have fair to poor potential. This unit has fair to good potential for most recreation uses and for residential or other urban uses.

12. Comfrey-Selma

Deep, poorly drained, nearly level soils that formed in recent alluvium or in outwash sediment; on flood plains and low stream terraces

This map unit consists of nearly level soils on flood plains and low stream terraces. This unit makes up about 13 percent of the survey area. It is about 25 percent Comfrey soils, 15 percent Selma soils, and 60 percent minor soils.

Comfrey soils are poorly drained, nearly level soils that are mainly on flood plains. The surface layer is black or very dark gray loam and clay loam. It is more than 24 inches thick. Below the surface layer, dark grayish brown, very dark grayish brown, or grayish brown loam, sandy loam, and loamy fine sand extends to a depth of 60 inches.

Selma soils are poorly drained and are on low stream terraces. Typically, the surface layer is black loam and clay loam 17 inches thick. The subsoil is dark gray, gray, and light brownish gray heavy loam or clay loam about 31 inches thick. The underlying material, which extends to a depth of 60 inches, is bands of light brownish gray and gray sand and fine sand.

The minor soils are Lawson, Marshan, Hayfield, Will, Millington, Houghton, Kane, Beardstown, Orion, and Sawmill soils. Lawson soils are somewhat poorly drained and are near the Pecatonica River in Winnebago County. Marshan soils are poorly drained and very poorly drained

and are nearly level; they are mainly in areas near Selma soils on the Sugar River lowlands in Winnebago County and on the Coon Creek lowlands in Boone County. Hayfield soils are somewhat poorly drained and are nearly level; they are near Selma soils mainly on the Sugar River lowlands. Will soils are poorly drained, nearly level soils in areas of the Piscasaw and Kishwaukee River Terraces. Millington soils are poorly drained and nearly level and are near Comfrey soils. Houghton soils are very poorly drained, nearly level organic soils that are near Selma soils. Kane soils are somewhat poorly drained and are nearly level; they are near Selma soils on slight rises on low stream terraces. Beardstown soils are somewhat poorly drained and nearly level and are near Selma soils. Orion soils are somewhat poorly drained and nearly level and are in alluvial areas near Comfrey soils. Sawmill soils are poorly drained and nearly level and are near Comfrey soils.

In areas where the soils have been drained, this map unit is used mainly for cultivated crops. In areas where the soils are near rivers, this unit is used as permanent pasture and for timber production. The main concern of management is improving drainage. The main agricultural enterprise is growing cash crops and feeding livestock. Flooding is a hazard in some areas of this map unit.

If the soils in this unit are adequately drained, this map unit has good potential for cultivated crops. It has poor potential for residential and other urban uses because of wetness. Wetness is a severe limitation, and it is difficult to overcome. This unit has good potential for the development of habitat for wetland wildlife.

Broad land use considerations

It is estimated that nearly one-eighth of the survey area, about 65,000 acres, is urban or built-up land. The general soil map can be used to plan general outlines for urban development; however, it cannot be used to select sites for specific urban structures. In general, the soils in the survey area that have good potential for cultivated crops also have good potential for urban development.

The soils that have limitations that preclude their use for urban development are not extensive in the survey area. However, the Comfrey-Selma map unit includes large areas of soils on flood plains where flooding and ponding are a severe limitation. The Edmund-Chelsea-Winnebago, Whalan-NewGlarus-Dunbarton, and Ashdale-Rockton-Dodgeville map units include soils that are shallow or moderately deep to bedrock, and urban development is costly on these soils. Urban development also is costly on the strongly sloping soils of the Griswold-Winnebago map unit.

Urban development is not so costly on the less sloping soils of the Tama-Ogle-Plano, Flagg-Pecatonica, and Griswold-Winnebago map units and on the less sloping, well drained soils of the Drummer-Parr, Miami-Kendall, Flagler-Warsaw-Hononegah map units. The Tama-Ogle-Plano, Flagg-Pecatonica, Griswold-Winnebago, Parr-Drummer, and Miami-Kendall map units are good to excellent farmland. Most of the soils in the Flagler-Warsaw-Hononegah map unit have gravel at a depth of less than 40 inches; these soils are somewhat droughty and are limited for use as farmland.

The Andres, Drummer, and Kendall soils in the Varna-Andres, Parr-Drummer, and Miami-Kendall map units are limited for nonfarm uses because of wetness. This limitation can be overcome by proper drainage and by shaping the surface. In many areas, these soils have been drained sufficiently for crop production, and they have good potential for farming.

The well drained, sandy soils of the Edmund-Chelsea-Winnebago and Flagler-Warsaw-Hononegah map units are well suited to vegetables and other specialty crops. These soils warm up earlier in spring than the wetter, more clayey soils. They are commonly used for Christmas-tree production.

Most of the soils in the survey area have good or fair potential for use as woodland. However, trees do not grow naturally on the soils of the Tama-Ogle-Plano, Varna-Andres, Parr-Drummer, and Flagler-Warsaw-Hononegah map units.

The rolling soils of the Griswold-Winnebago, Edmund-Chelsea-Winnebago, Whalan-NewGlarus-Dunbarton, and Ashdale-Rockton-Dodgeville map units have excellent potential as sites for parks and extensive recreation areas. Hardwood forests cover large areas of these map units. Areas of undrained soils in the Comfrey-Selma map unit are good as nature study areas.

Soil maps for detailed planning

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and management of the soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil, a brief description of the soil

profile, and a listing of the principal hazards and limitations to be considered in planning management.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Tama silt loam, 0 to 2 percent slopes, is one of several phases in the Tama series.

Some map units are made up of two or more major soils. These map units are called soil complexes or undifferentiated groups.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. The Rodman-Warsaw complex, 4 to 7 percent slopes, eroded, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Rockton and Dodgeville soils, 1 to 5 percent slopes, is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits, gravel, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

In Green, Rock, and Walworth Counties in Wisconsin, 17 soils that were mapped join with similar soils that have different names in Winnebago and Boone Counties, Illinois. These soils mapped in Wisconsin were not included in the soil survey of Winnebago and Boone Counties either because their extent was insignificant or because of conceptual changes as a result of changes in soil classification. Three soils and one complex that were mapped in Stephenson County, Illinois, were not mapped in Winnebago and Boone Counties because their extent was insignificant. These soils join with similar soils, which have different names, in this survey.

Soil descriptions

21B—Pecatonica silt loam, 2 to 5 percent slopes. This is a well drained, gently sloping soil on upland divides, ridgetops, and the upper part of side slopes. Areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is very dark brown, friable silt loam about 3 inches thick. The subsurface layer is about 9 inches thick. In the upper part, it is grayish brown, friable silt loam; and in the lower part, it is light yellowish brown, friable silt loam. The subsoil extends to a depth of 65 inches. In the upper part, it is dark yellowish brown, friable silt loam; in the next part, it is dark brown, firm loam; in the next part, it is mixed red and dark reddish brown, firm sandy clay loam; and in the lowermost part, it is dark brown, firm sandy loam. In some places, the silty upper part of the profile is thicker than is typical. In other places, the reddish part of the subsoil is not so thick.

Included in mapping are small areas of somewhat poorly drained Kendall soils and poorly drained Selma and Drummer soils in shallow depressions and drainageways. These soils make up 2 to 5 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is moderate to rapid. In the upper part, the subsoil is slightly acid to strongly acid; and in the lower part, it is medium acid to moderately alkaline and calcareous. The available water capacity is high. The organic matter content is moderately low. This soil is moderately susceptible to frost heave, and the shrink-swell potential is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content.

In most areas, this soil is used for farming. It has good potential for cultivated crops, hay, pasture, and trees. It has fair potential as sites for sanitary facilities and for building site development.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce the loss

of soil due to erosion. Returning crop residue or adding other organic material to the soil helps to improve fertility, reduce crusting, and increase water infiltration.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has a low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing. The bottom of sewage lagoons must be sealed to avoid the contamination of ground water. This soil is well suited to use as septic tank absorption fields.

Capability subclass IIe.

21C2—Pecatonica silt loam, 5 to 9 percent slopes, eroded. This is a sloping, well drained soil on side slopes along drainageways. The areas are irregular in shape and range from 5 to 80 acres in size.

Typically, the surface layer is yellowish brown silt loam about 8 inches thick. The subsoil extends to a depth of 58 inches. In the upper part, it is dark yellowish brown, friable silt loam; in the next part, it is dark brown, firm loam; in the next part, it is mixed red and dark reddish brown, firm sandy clay loam; and in the lowermost part, it is dark brown, firm sandy loam. The substratum, to a depth of 60 inches, is yellowish brown, calcareous sandy loam till. In some places, the original surface layer has been removed by erosion, and the plow layer is loam or clay loam. In places, the slope is more than 9 percent.

Included in mapping are small areas of somewhat poorly drained Kendall soils and poorly drained Drummer and Selma soils in shallow depressions and drainageways. These soils make up 2 to 10 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is medium to rapid. The subsoil is slightly acid to strongly acid in the upper part, and it is medium acid to moderately alkaline and calcareous in the lower part. The available water capacity is high. The organic matter content is moderately low. This soil is moderately susceptible to frost heave, and the shrink-swell potential is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content.

In most areas, this soil is used for cultivated crops. It has fair potential for cultivated crops and for hay, pasture, and trees. It has fair potential for building site development.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. If this soil is used for cultivated crops, erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce the loss of soil due to erosion. Returning crop residue or adding other organic material to the soil helps to improve fertility, reduce crusting, and increase water infiltration.

Using this soil as pastureland or hayland also is effective in controlling erosion. Overgrazing reduces the yield of forage and increases the erosion hazard. Fertilization, proper stocking rates, pasture rotation, and good weed control help to keep pasture and soil in good condition.

This soil is well suited to use as woodland. Tree seedlings survive and grow well if competing vegetation is controlled or removed. There are no limitations to planting or harvesting trees.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields. Slope is a limitation to use as sewage lagoons. This limitation can be overcome by smoothing.

Capability subclass IIIe.

22B—Westville silt loam, 2 to 5 percent slopes. This is a gently sloping, well drained soil on upland interfluves and shoulder slopes. Areas are irregular in shape and range from 5 to 20 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsoil extends to a depth of 60 inches. It is brown, yellowish red, and reddish brown firm clay loam to a depth of 50 inches; and below that it is light yellowish brown, friable sandy loam and clay loam. In some areas, the lower part of the subsoil is brown, calcareous sandy loam till. In other places, the surface layer is thicker and darker than is typical. In places, the upper part of the subsoil is less sandy.

Included in mapping are small areas of well drained Whalan and NewGlarus soils. These soils are on shoulder-slope breaks and have bedrock within a depth of 40 inches. They make up 2 to 5 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is medium. This soil is medium acid to strongly acid. The available water capacity is high. The organic matter con-

tent is moderately low. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. The shrink-swell potential is moderate.

In most areas, this soil is used for crops. It has good potential for cultivated crops and for hay, pasture, and trees. It has fair to poor potential as sites for most buildings and good to fair potential as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. If this soil is used for cultivated crops, erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to improve fertility, to reduce crusting, to increase water infiltration, and to reduce erosion.

Using this soil as pastureland or hayland also helps to control erosion. Overgrazing and poor weed control can cause a poor yield and can increase the hazard of erosion. Fertilization, proper stocking rates, pasture rotation, and good weed control help to keep pasture and soil in good condition.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. The soil is well suited to use as septic tank absorption fields. The bottom of sewage lagoons needs to be sealed to avoid contaminating ground water. Slope is a limitation to use as sewage lagoons. This limitation can be overcome by smoothing.

Capability subclass IIe.

22C2—Westville silt loam, 5 to 9 percent slopes, eroded. This is a sloping, well drained soil on the upper part of side slopes on uplands. Areas are irregular in shape and range from 2 to 20 acres in size.

Typically, the surface layer is brown silt loam about 7 inches thick. The subsoil is brown and reddish brown firm clay loam about 48 inches thick. The substratum, to a depth of 60 inches, is yellowish brown, calcareous sandy loam till. In places, the surface layer is darker and thicker than is typical. In some areas, the upper part of the subsoil is less sandy. In other areas, the subsoil is brown loam. In some areas, the sandy loam till is closer to the surface.

Included in mapping are small areas of well drained Whalan and NewGlarus soils. These soils are on side slopes and shoulder slopes and have bedrock within a depth of 60 inches. Whalan and NewGlarus soils make up 2 to 5 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is medium. This soil is medium acid to strongly acid. The available water capacity is high. The organic matter content is moderately low. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. The shrink-swell potential is moderate.

This soil is used for crops. It has fair potential for grain and seed crops and good potential for hay, pasture, and trees. It has fair to good potential for building site development.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to improve fertility, to reduce crusting, to increase water infiltration, and to reduce erosion.

Using this soil as pastureland or hayland helps to control erosion. Overgrazing reduces yields and increases erosion. Fertilization, proper stocking rates, pasture rotation, and good weed control help to keep pasture and soil in good condition.

This soil is well suited to use as woodland. Tree seedlings survive and grow well if competing vegetation is controlled or removed. There are no limitations to planting or harvesting trees.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. The soil is well suited to use as septic tank absorption fields. Slope is a limitation to use as sewage lagoons; this limitation can be overcome by smoothing.

Capability subclass IIIe.

22D2—Westville silt loam, 9 to 15 percent slopes, eroded. This is a strongly sloping, well drained soil on upland side slopes adjacent to drainageways and streams. Areas are irregular in shape and range from 5 to 20 acres in size.

Typically, the surface layer is brown heavy silt loam or clay loam about 6 inches thick. The subsoil is brown and reddish brown, firm clay loam about 42 inches thick. The substratum, to a depth of 60 inches, is yellowish brown, calcareous sandy loam till. In some places, the sandy loam till is closer to the surface. In places, the surface layer is more sandy than is typical.

Included in mapping are small areas of well drained Whalan and NewGlarus soils. These soils are on side slopes and on the upper part of shoulder slopes and have bedrock within a depth of 60 inches. Whalan and NewGlarus soils make up 2 to 5 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is rapid. This soil ranges from medium acid to strongly acid. The available water capacity is high. Natural fertility

is medium; however, the organic matter content is moderately low because of the loss of surface soil due to erosion. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. The shrink-swell potential is moderate.

In most areas, this soil is used for farming. It has good potential for hay, pasture, and trees. It has fair potential for building site development and fair to poor potential as sites for sanitary facilities.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil is well suited to use as woodland. Tree seedlings survive and grow well if competing vegetation is controlled or removed. There are few hazards or limitations to planting or harvesting trees.

This soil can be used for the development of habitat for openland or woodland wildlife. It is suitable for woody and herbaceous plants. Wildlife habitat developments can include trees, shrubs, and grasses and legumes.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. Septic tank absorption field lines need to be designed and placed on the contour to provide for an even distribution of effluent. Slope is a limitation to the use of this soil as sewage lagoons; this limitation can be overcome by smoothing.

Capability subclass VIe.

27B—Miami silt loam, 1 to 5 percent slopes. This is a gently sloping, well drained soil on convex ridgetops, knolls, and short, uneven side slopes. Areas are irregular in shape and range from 2 to 100 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 7 inches thick. The subsoil is about 26 inches thick. In the upper part, it is brown, friable silty clay loam; in the middle part, it is brown and reddish brown, friable clay loam; and in the lower part, it is mixed yellowish red, yellowish brown, and brown firm clay loam. The substratum, to a depth of 60 inches, is brown, calcareous loam till. In places, the subsoil is deeper to the calcareous loam till. In a few areas, the substratum is brown sandy loam, loamy sand, or sand. In some areas, this soil is less sandy in the upper part of the profile.

Included in mapping are small areas of somewhat poorly drained Kendall, Odell, and Herbert soils and poorly drained Drummer and Selma soils. These soils are in shallow depressions and make up 1 to 8 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is medium. The available water capacity is moderate. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to slightly acid. The organic matter content is moderately low because of the loss of surface soil due to erosion. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. If this soil is worked when wet, the surface tends to crust or the soil puddles. The root zone is somewhat restricted by the compact loam glacial till at a depth of about 33 inches.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay, pasture, and trees. It has fair potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to improve fertility, reduce crusting, and increase water infiltration.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

Shrinking and swelling are a limitation to the use of the soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to accommodate the slow movement of effluent. The bottom of sewage lagoons needs to be sealed to avoid the contamination of ground water. Slope is a limitation for sewage lagoons; this limitation can be overcome by smoothing.

Capability subclass IIe.

27C2—Miami silt loam, 5 to 9 percent slopes, eroded. This is a sloping, well drained soil on convex side slopes. Areas are irregular in shape and range from 2 to 60 acres in size.

Typically, the surface layer is brown silt loam or loam about 7 inches thick. The subsoil is about 21 inches thick. In the upper part, it is dark brown and reddish brown, friable clay loam; and in the lower part, it is yellowish red, yellowish brown, and brown, firm clay loam. The substratum, to a depth of 60 inches, is brown,

calcareous loam. In some places, the subsoil is deeper to the calcareous loam. In a few areas, the substratum is brown sandy loam, loamy sand, or sand. In other areas where material from the upper part of the subsoil has been mixed with the original surface layer through plowing, the present surface layer is dark brown clay loam. In a few areas, this soil is less sandy in the upper part of the profile.

Included in mapping are small areas of somewhat poorly drained Drummer and Selma soils. These soils are in shallow depressions and make up 1 to 7 percent of this map unit.

Permeability is moderate in the subsoil and moderately slow in the substratum. Runoff in cultivated areas is medium to rapid. The surface layer varies widely in reaction because of local liming practices. The subsoil is strongly acid to neutral. The available water capacity is moderate. The organic matter content is moderately low because the surface layer has been eroded. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. In areas where material from the subsoil has been mixed into the plow layer, the surface tends to crust or the soil puddles after a hard rain. The root zone is somewhat restricted by the compact loam glacial till at a depth of about 26 inches.

In most areas, this soil is used for farming. It has fair potential for cultivated crops and good potential for hay, pasture, and trees. It has fair potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to improve fertility, to reduce crusting, and to increase water infiltration.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil is very well suited to use as woodland. In a few areas, this soil is in native hardwoods. Tree seedlings survive and grow well if competing vegetation is controlled or removed. Erosion is a hazard when planting or harvesting trees.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to compensate for the slow movement of effluent. Slope is a limitation to use as sewage lagoons. This limitation can be overcome by smoothing.

Capability subclass IIIe.

36A—Tama silt loam, 0 to 2 percent slopes. This is a nearly level, well drained soil on upland drainage divides and foot slopes. Areas are irregular in shape and range from 2 to 80 acres in size.

Typically, the surface layer is very dark gray and very dark grayish brown silt loam about 13 inches thick. The subsoil is about 36 inches thick. In the upper part, it is dark brown, friable silty clay loam; and in the lower part, it is dark yellowish brown and yellowish brown, friable silty clay loam. The substratum, to a depth of 60 inches, is brown and yellowish brown silt loam. In a few areas, the surface layer in thinner and darker, and in other areas it is thicker and darker than is typical. In some places, the substratum is brown and yellowish brown, stratified silt loam, loam, and sandy loam.

Included in mapping are small areas of somewhat poorly drained Muscatine and Elburn soils and poorly drained Sable and Drummer soils. These soils are in shallow depressions and drainageways. They make up 2 to 5 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is medium. The surface layer varies in reaction because of local liming practices. The subsoil is neutral to medium acid. The available water capacity is very high, and the organic matter content is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has fair potential for building site development and good potential for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Conservation tillage and returning crop residue to the soil help to reduce erosion. Returning crop residue to the soil also helps to reduce crusting and to improve tilth.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields. The floor of sewage lagoons needs to be sealed to avoid contaminating ground water.

Capability class I.

36B—Tama silt loam, 2 to 5 percent slopes. This is a gently sloping, well drained soil on upland side slopes

and convex ridgetops. Areas are irregular in shape and range from 2 to several hundred acres in size.

Typically, the surface layer is very dark gray and very dark grayish brown silt loam about 11 inches thick. The subsoil is about 36 inches thick. In the upper part, it is brown, friable silty clay loam; and in the lower part, it is dark yellowish brown and yellowish brown, friable silty clay loam. The substratum, to a depth of about 60 inches, is brown and yellowish brown silt loam. In a few areas, the surface layer is thinner than is typical. In places, the substratum is brown or reddish brown loam, clay loam, or sandy loam. In areas where this soil is in drainageways, the surface layer is thicker and darker colored.

Included in mapping are small areas of somewhat poorly drained Muscatine and Elburn soils and poorly drained Sable and Drummer soils. These soils are in shallow depressions and drainageways. They make up 2 to 4 percent of this map unit. In some areas, calcareous loess is at or near the surface.

Permeability is moderate, and runoff in cultivated areas is medium. The surface layer varies in reaction because of local liming practices. The subsoil is neutral to medium acid. The available water capacity is very high. The organic matter content is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has fair potential for building site development and good potential for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion. Returning crop residue to the soil helps to reduce crusting and to increase water infiltration.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. The soil is well suited to use as septic tank absorption fields. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water. Slope is a limitation for sewage lagoons; this limitation can be overcome by smoothing.

Capability subclass IIe.

36C2—Tama silt loam, 5 to 9 percent slopes, eroded. This is a sloping, well drained soil on convex side slopes on uplands. Areas are irregular in shape and range from 2 to 50 acres in size.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil is about 30 inches thick. In the upper part, it is brown, friable silty clay loam; and in the lower part, it is dark yellowish brown and yellowish brown, friable silty clay loam. The substratum, to a depth of 60 inches, is brown and yellowish brown silt loam. In some places, the substratum is brown or reddish brown loam, clay loam, or sandy loam. In other areas where material from the upper part of the subsoil has been mixed with the original surface layer by plowing, the plow layer is brown silty clay loam.

Included in mapping are small areas of somewhat poorly drained Muscatine and Elburn soils. These soils are in drainageways and make up 2 to 3 percent of this map unit. In some areas, calcareous loess is at or near the surface.

Permeability is moderate, and runoff in cultivated areas is medium to rapid. The surface layer varies in reaction because of local liming practices. The subsoil is neutral to medium acid. The available water capacity is very high, and the organic matter content is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has fair potential for building site development and good potential for use as septic tank absorption fields. This soil is suited to corn, soybeans, small grains, and grasses and legumes.

Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion. Returning crop residue to the soil helps to reduce crusting and to increase water infiltration.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields. Slope is a limitation for sewage lagoons; this limitation can be overcome by smoothing.

Capability subclass IIIe.

41—Muscatine silt loam. This is a nearly level soil on the lower part of slopes, on upland drainage divides, and

in depressions and drainageways. Areas are irregular in shape and range from 5 to 200 acres in size.

Typically, the surface layer is black and very dark grayish brown silt loam about 16 inches thick. The subsoil is about 25 inches thick. In the upper part, it is brown, mottled, friable silty clay loam; in the middle part, it is yellowish brown, mottled, friable light silty clay loam; and in the lower part, it is grayish brown and yellowish brown, mottled light silty clay loam. The substratum, to a depth of 69 inches, is yellowish brown to brownish yellow, mottled, friable silt loam. In some areas, the surface layer is less than 10 inches thick. In other areas, this soil has more sand than is typical. In some areas, outwash sediment is within a depth of 60 inches.

Included in mapping are small areas of poorly drained Sable and Drummer soils. These soils are in shallow depressions and drainageways and make up 2 to 10 percent of this map unit. Also included are small areas of well drained Troxel and Tama soils. Troxel soils are at the head of drainageways and in small depressions and make up 2 to 5 percent of this map unit. Tama soils are slightly higher and are better drained than Muscatine soils; they make up 5 to 10 percent of this map unit.

Permeability is moderate, and runoff is slow. The available water capacity is very high. The surface layer is friable and can be worked easily. If this soil is worked when it is too wet, it becomes hard and cloddy. The shrink-swell potential is moderate. The organic matter content and the natural fertility are high. The surface layer is strongly acid. The substratum is mildly alkaline. The seasonal high water table is at a depth of 1 to 3 feet.

In most areas, this soil is used for farming. It has very good potential for cultivated crops and for legumes and grasses. It has fair to poor potential for building site development and as sites for sanitary facilities.

This soil is well suited to corn, soybeans, small grains, and grasses and legumes. In most areas, drainage tiles have been used to drain this soil. The use of conservation tillage and returning crop residue to the soil help to reduce soil blowing and water erosion.

The seasonal water table limits the use of this soil as a site for dwellings with or without a basement. A drainage system needs to be installed to help overcome this limitation. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. A septic tank absorption field will not function properly on this soil unless the seasonal water table is lowered or the absorption field is placed in a seepage bed above the water table. This soil is poorly suited to use as sewage lagoons because of the seasonal high water table.

Capability class I.

59—Lisbon silt loam. This is a nearly level, somewhat poorly drained soil on slight convex rises or on concave foot slopes. Areas are irregular in shape and range from 2 to several hundred acres in size.

Typically, the surface layer is very dark brown silt loam about 11 inches thick. The subsoil is about 28 inches thick. In the upper part, it is brown and yellowish brown, friable silty clay loam that has grayish brown and yellowish brown mottles; in the middle part, it is light olive brown and olive brown, firm silty clay loam that has yellowish brown and grayish brown mottles; and in the lower part, it is yellowish brown, firm clay loam that has light brownish gray and light yellowish brown mottles. The substratum, to a depth of 60 inches, is light yellowish brown, calcareous loam till that has greenish gray and yellowish brown mottles. In a few places, the surface layer is less than 10 inches thick. In places, the subsoil is deeper to calcareous loam till than is typical. In a few places, the substratum is light yellowish brown sandy loam, loamy sand, or sand. The subsoil in some areas formed in clay loam glacial drift.

Included in mapping are small areas of well drained Parr, Jasper, and Saybrook soils and poorly drained Drummer and Selma soils. Parr, Jasper, and Saybrook soils are on mounds, bumps, or slightly higher rises. Drummer and Selma soils are in shallow depressions and drainageways. These soils make up 2 to 6 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is slow to medium. The surface layer varies in reaction because of local liming practices. The subsoil is neutral to strongly acid. The available water capacity is high. The organic matter content is high. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. If this soil is plowed when wet, the surface tends to crust, and the soil puddles after a hard rain. The root zone is somewhat restricted by compact, loamy glacial till at a depth of about 40 inches. The seasonal water table is at a depth of 1 to 3 feet.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Winter cover crops help to prevent excessive soil loss. Seasonal wetness is the only hazard to the continuous production of row crops.

The seasonal water table limits the use of this soil as a site for dwellings with or without a basement. A drainage system needs to be installed to help overcome this limitation. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. A septic tank absorption field will not function properly on this soil unless the seasonal water table is lowered or the absorption field is placed in a seepage bed above the water table. This soil is not suited to use as sewage lagoons because of the seasonal high water table.

Capability class I.

61—Atterberry silt loam. This is a nearly level, somewhat poorly drained soil on broad stream terraces and on upland plains. Areas are irregular in shape and range from 2 to 100 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsurface layer is brown silt loam about 5 inches thick. The subsoil extends to a depth of 60 inches. In the upper part, the subsoil is dark grayish brown silt loam and brown silty clay loam, and in the lower part, it is light brownish gray and olive brown silt loam. In some places, the surface layer is thicker than is typical; in a few places, it is lighter colored. In some small areas, the slope is more than 3 percent.

Included in mapping are small areas of well drained Downs and Fayette soils. These soils are in slightly elevated areas and make up 2 to 10 percent of this map unit.

Permeability is moderate or moderately slow, and runoff is slow. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to strongly acid. The organic matter content is moderate. The available water capacity is very high. The shrink-swell potential of the subsoil is moderate. The seasonal water table is at a depth between 1 and 3 feet.

In most areas, this soil is used for farming. It has good potential for cultivated crops, small grains, hay, and pasture. It has poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Drainage may be needed in some places. Tile drainage is effective. If the soil is worked when wet, the surface compacts and the soil structure deteriorates. Returning crop residue to the soil helps to keep losses from soil blowing and water erosion to a minimum.

The seasonal water table limits the use of this soil as a site for dwellings with or without a basement. A drainage system needs to be installed to help overcome this limitation. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. A septic tank absorption field will not function properly on this soil unless the seasonal water table is lowered or the absorption field is placed in a seepage bed above the water table. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to compensate for the slow movement of effluent. This soil is not suited to use as sewage lagoons because of the seasonal high water table.

Capability class I.

62—Herbert silt loam. This is a nearly level, somewhat poorly drained soil on low rises and foot slopes. Areas are irregular in shape and range from 2 to 100 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 6 inches thick. The subsurface layer is brown silt loam about 3 inches thick. The subsoil is about 31 inches thick. In the upper part, the subsoil is grayish brown, firm silty clay loam, and in the lower part, it is mixed grayish brown and strong brown, firm silty clay loam. The substratum, to a depth of 60 inches, is mottled grayish brown, calcareous loam till. In a few areas, the surface layer is less than 6 inches thick; in other areas, it is more than 10 inches thick. In some places, the subsoil is deeper to calcareous loam till than is typical; in some areas, the subsoil is grayish brown, firm clay loam. In a few areas, the substratum is grayish brown loamy sand, sandy loam, or sand.

Included in mapping are small areas of well drained Saybrook, Parr, and Miami soils and poorly drained Drummer and Selma soils. The well drained soils are in higher landscape positions, and the poorly drained soils are in shallow depressions and drainageways. These soils make up 2 to 8 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is slow to medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to strongly acid. The available water capacity is moderate. The organic matter content is moderate. The shrink-swell potential of the subsoil is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. If this soil is worked when wet, the surface tends to crust, or the soil puddles after a hard rain. The root zone is somewhat restricted by compact loamy glacial till at a depth of about 40 inches. The seasonal water table is at a depth between 1 and 3 feet.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay, pasture, and trees. It has poor potential for building site development and as sites for sanitary facilities.

This soil is well suited to corn, soybeans, small grains, and grasses and legumes. Returning crop residue or adding other organic material to the soil helps to improve fertility, to reduce crusting, and to increase water infiltration.

The seasonal water table limits the use of this soil as a site for dwellings with or without a basement. A drainage system needs to be installed to help overcome this limitation. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. A septic tank absorption field will not function properly on this soil unless the seasonal water table is lowered or the absorption field is placed in a seepage bed above the water table. This soil is not suited to use as sewage lagoons because of the seasonal high water table.

Capability class I.

68—Sable silty clay loam. This is a nearly level or depressional, poorly drained soil in upland depressions

and drainageways and on stream terraces. Areas are irregular or linear in shape and range from 2 to more than 100 acres in size. This soil is subject to occasional flooding for brief periods in spring.

Typically, the surface layer is black and very dark gray silty clay loam about 14 inches thick. The subsoil is about 38 inches thick. In the upper part, it is dark gray and gray silty clay loam, and in the lower part it is mottled, gray silty clay loam. The substratum, to a depth of 60 inches, is gray and yellowish brown silt loam. In some areas, the surface layer is thinner than is typical and in others it is less clayey. In places, the silty subsoil is thinner than is typical and is underlain by stratified sandy material.

Included in mapping are small areas of somewhat poorly drained Muscatine, Elburn, Atterberry, and Virgil soils. These soils are in slightly higher positions on the landscape. Also included are small areas where the soil has a sandy surface layer; these areas are shown on the soil maps by a spot symbol. These soils make up about 2 to 10 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is slow to ponded. The seasonal water table is at or near the surface. The subsoil is slightly acid to mildly alkaline. The substratum is neutral or mildly alkaline. Calcareous material commonly is included in the substratum. The available water capacity is very high. The organic matter content is high. The shrink-swell potential is moderate. The surface layer is clayey and sticky when wet. If this soil is tilled when wet, the surface becomes cloddy and preparation of the seedbed is difficult.

In most areas, this soil is used for farming. If this soil is drained, it has good potential for cultivated crops and for hay and pasture. It has poor potential for building site development and as sites for sanitary facilities.

This soil is well suited to corn and soybeans. It is well suited to hay and to use as pasture. Drainage is needed for optimum yields. Tile drains are effective if suitable outlets are available. Conservation tillage and returning crop residue to the soil help to improve tilth and reduce erosion.

The seasonal water table limits the use of this soil as a site for dwellings with or without a basement. A drainage system needs to be installed to help overcome this limitation. This soil needs to be protected from flooding. Low strength is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. The seasonal high water table and the occasional ponding cause onsite sewage disposal systems to function poorly or fail in some periods of the year.

Capability subclass IIw.

82—Millington silt loam. This is a nearly level, poorly drained soil in depressions and on flood plains along streams and rivers. Areas are irregular in shape and range from 10 to 80 acres in size. This soil is subject to frequent flooding for brief periods in spring.

Typically, the surface layer is black silt loam about 26 inches thick. The subsoil is about 27 inches thick. In the upper part, it is black and dark grayish brown, friable, heavy silt loam; and in the lower part, it is dark grayish brown, friable loam. The substratum, to a depth of 60 inches, is light grayish brown, loose loamy sand. In some places, the soil material is noncalcareous throughout. In some areas, the surface layer and subsoil have more sand. In places, there is gravel in the substratum.

Included in mapping are small areas of very poorly drained Adrian and Houghton soils. These soils are very high in organic matter and are in shallow depressions. They make up 2 to 5 percent of this map unit. Areas of these soils generally are indicated on the soil maps with a spot symbol.

Permeability is moderate, and runoff in cultivated areas is slow to ponded. This soil is mildly alkaline to strongly alkaline. The organic matter content and the available water capacity are high. Natural fertility is high, but the high pH reduces the availability of some micronutrients, including iron, manganese, copper, and zinc. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. At times, the water table is within a depth of 2 feet.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, and grasses and legumes. Adequate drainage is necessary; however, outlets are few and are difficult to maintain. Flooding is a hazard to early-planted crops. The high calcium content of this soil can limit the availability of some micronutrients.

The seasonal water table limits the use of this soil as a site for dwellings with or without a basement. A drainage system needs to be installed to help overcome this limitation. This soil needs to be protected from flooding. The seasonal water table and the hazard of flooding are limitations to using this soil for roads and streets. These limitations are difficult to overcome. Low strength also is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. This soil is not suitable for use as septic tank absorption fields and sewage lagoons because of the high water table and the hazard of flooding.

Capability subclass IIw.

93E2—Rodman gravelly loam, 12 to 30 percent slopes, eroded. This is a moderately steep and steep, excessively drained soil on upland kames and eskers and on stream terrace breaks. This soil formed in loamy material, about 8 to 15 inches thick, over calcareous sand and gravel. Areas are linear in shape and range from 2 to about 30 acres in size.

Typically, the surface layer is very dark brown gravelly loam about 6 inches thick. The subsoil is dark brown gravelly loam about 3 inches thick. The substratum, to a depth of 60 inches, is dark yellowish brown, calcareous sand and gravel. In some places, the calcareous sand and gravel are at the surface.

Included in mapping are small areas of well drained Warsaw soils. These soils have slopes of less than 12 percent and make up 5 to 15 percent of this map unit.

Permeability is very rapid, and runoff is medium. The available water capacity is low. The organic matter content is moderate. The root zone is restricted by calcareous sand and gravel.

This soil has poor potential for cultivated crops, small grains, and hay. It has fair potential for use as pasture, as woodland, and as habitat for openland and woodland wildlife. It has poor potential for building site development and as sites for sanitary facilities.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

In a few areas, this soil is used as woodland. It is moderately suited to this use. The steep slopes are a limitation to harvesting operations. If this soil is used as habitat for wildlife, droughtiness and low fertility limit the development of a grass-legume cover and food plots for wildlife.

This soil is poorly suited to building site development and onsite sewage disposal systems because the slopes are steep and the underlying material is rapidly permeable.

Capability subclass VIs.

100—Palms muck. This is a nearly level, very poorly drained soil in low swampy areas along small streams and in basins of former lakes and ponds. Areas are irregular in shape and range from 10 to 200 acres in size. This soil is subject to frequent flooding for long periods in winter and spring.

Typically, black muck extends to a depth of about 26 inches. The substratum is gray, friable silty clay loam and extends to a depth of 60 inches. In some areas, the muck extends to a depth of more than 60 inches. In some areas, the substratum has more sand than is typical.

Included in mapping are small areas of poorly drained Sable, Drummer, and Selma soils. These mineral soils are at the edge of the bogs and make up 5 to 15 percent of this map unit.

Permeability is moderately rapid in the organic material and moderate in the loamy material. Runoff is very slow. The soil is strongly acid to moderately alkaline. In some places, the substratum is calcareous. The available water capacity and organic matter content are very high. The water table is within a depth of 1 foot in some periods. Unless it has been drained, this soil is difficult to till. The rate of subsidence in drained and cultivated areas is about 1 foot in 10 years.

In most areas, this soil has been drained and is used as pasture. In some areas, it is used for corn and soybeans. It has fair potential for cultivated crops and for use as pasture. Some truck crops can be grown. This soil has good potential for the development of habitat for wetland wildlife. It has poor potential for building site development and as sites for sanitary facilities.

If this soil is adequately drained, it can be used for corn and soybeans and as pasture. When this soil is dry, soil blowing is a hazard. The use of field windbreaks and conservation tillage and returning crop residue to the soil help to reduce soil loss. This soil has low bearing strength, and equipment cannot be used in wet periods.

This soil has good potential for the development of habitat for wetland wildlife. The native plant species provide good food and cover for wetland wildlife.

Septic tank filter fields do not function because of the high water table and the occasional flooding. Sewage lagoons are seepy and can cause pollution of underground water. Shallow excavations fill with water, and cutbanks cave in. This soil does not have enough strength to support buildings or roads and streets. The excess humus makes this soil hard to pack.

Capability subclass IIw.

102—La Hogue silt loam. This is a nearly level, somewhat poorly drained soil on stream terraces, on outwash plains, and in upland drainageways. Areas are irregular in shape and range from 2 to several hundred acres in size.

Typically, the upper part of the surface layer is black silt loam about 8 inches thick, and the lower part is very dark grayish brown silty clay loam about 7 inches thick. The subsoil is 27 inches thick. In the upper part, it is dark grayish brown, friable silty clay loam; in the next part, it is dark grayish brown, friable clay loam; in the next part, it is mixed dark grayish brown and yellowish brown, friable sandy clay loam; and in the lowermost part, it is mixed brown and very dark grayish brown, friable loamy sand. The substratum is brown, loose coarse sand. In some areas, the surface layer is loamy, and in some areas it is lighter colored than is typical. In places, the surface layer is thinner or thicker than is typical. In some areas, the subsoil is thinner and is shallower to calcareous material. In other areas, loose sand is within a depth of 40 inches.

Included in mapping are small areas of poorly drained Drummer and Selma soils in depressions and lower positions on the landscape. These soils make up 5 to 15 percent of this map unit.

Permeability is moderate in the upper part of the subsoil, and it is rapid in the lower part of the subsoil and in

the substratum. Runoff in cultivated areas is slow. The seasonal water table is within a depth of about 1 to 3 feet. The available water capacity is high. The organic matter content is moderate. The surface layer is friable and can be worked easily within a fairly wide range in moisture content.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. In some areas, artificial drainage is needed to obtain optimum yields. Tile drainage is effective; however, a special design is needed because in places, the lower part of the subsoil has sandy layers. Returning crop residue and adding other organic material to the soil help to improve tilth.

The seasonal water table limits the use of this soil as a site for dwellings with or without a basement. A drainage system needs to be installed to help overcome this limitation. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. A septic tank absorption field will not function properly on this soil unless the seasonal water table is lowered or the absorption field is placed in a seepage bed above the water table. There is a hazard of ground water contamination because of seepage. This soil is not suitable for use as sewage lagoons because of the seasonal high water table.

Capability class I.

103—Houghton muck. This is a nearly level to depressional, very poorly drained soil in depressions on flood plains along rivers and streams. Areas are irregular in shape and range from 5 to 100 acres in size. This soil is subject to frequent flooding for long periods in winter and spring.

Typically, black muck extends to a depth of 44 inches. The substratum is dark gray loamy sand. In some areas, the black muck extends to a depth of more than 60 inches. In some areas, this soil has a higher fiber content. In places, deposits of mineral soil material are at a depth of less than 50 inches.

Included in mapping are small areas of poorly drained Drummer, Sable, Selma, and Comfrey soils. These mineral soils are at the edge of the bogs and make up 5 to 15 percent of this map unit.

Permeability is moderately rapid, and runoff is slow. The organic material ranges from strongly acid to mildly alkaline. The available water capacity and the organic matter content are very high. At times, the water table is within a depth of 1 foot. This soil is difficult to till. The rate of subsidence in drained and cultivated areas is about 1 foot in 10 years. The hazard of frost heave is high.

In most areas, this soil has been drained and is used as pasture. In some areas, this soil is used for corn and soybeans. It has fair potential for crops and for use as pasture. Some truck crops can be grown. This soil has good potential for the development of habitat for wetland wildlife. It has poor potential for building site development and sanitary facilities.

Unless this soil has been drained, it is not suited to cultivated crops. If it is adequately drained, this soil is suited to corn, soybeans, and pasture. This soil is well suited to specialty crops such as potatoes, onions, and bulbous floral plants. When the muck is dry, soil blowing and fire are hazards. The use of field windbreaks and conservation tillage and returning crop residue to the soil help to reduce soil loss. This soil has low bearing strength, and equipment cannot be used in wet periods. Tile drainage is not effective.

This soil has good potential for the development of habitat for wetland wildlife. The native plant species provide good food and cover for wetland wildlife.

Septic tank filter fields do not function because of the high water table and occasional flooding. Sewage lagoons are seepy and can cause pollution of underground water. Shallow excavations fill with water, and cutbanks cave in. This soil does not have enough bearing strength to support buildings and roads and streets. The excess humus makes this soil hard to pack.

Capability subclass IIIw.

104—Virgil silt loam. This is a nearly level, somewhat poorly drained soil in low areas on terraces and uplands. Areas are irregular in shape and range from 2 to 100 acres in size.

Typically, the surface layer is very dark gray silt loam about 7 inches thick. The subsurface layer is dark grayish brown silt loam about 8 inches thick. The subsoil is about 39 inches thick. In the upper part, it is light olive brown silty clay loam, and in the lower part, it is light olive brown and dark grayish brown sandy loam. The substratum, to a depth of 60 inches, is light brownish gray silt loam. In some places, the surface layer is thicker than is typical. In other places, the depth to underlying loamy material is greater. In a few places, the surface layer is light colored.

Included in mapping are small areas of poorly drained Sable and Drummer soils and well drained Plano soils. Sable and Drummer soils are in shallow depressions and drainageways and are saturated with water for a longer period than Virgil soils. Plano soils are in slightly higher areas. Also included are small low areas where the soils are saturated for prolonged periods. The included soils make up 10 to 15 percent of this map unit.

Permeability is moderate or moderately slow, and runoff is slow. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to medium acid. The organic matter content is moderate. The available water capacity is high. The surface layer is

friable and can be tilled easily within a fairly wide range in moisture content. After a hard rain, the surface tends to crust, or the soil puddles.

In most areas, this soil is used for farming. It has good potential for cultivated crops, small grains, hay, and pasture. It has poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Drainage is needed in some places. A tile drainage system is effective. If this soil is worked when wet, the surface compacts and the soil structure deteriorates. Returning crop residue to the soil helps to improve tilth.

The seasonal water table limits the use of this soil as a site for dwellings with or without a basement. A drainage system needs to be installed to help overcome this limitation. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. The potential for onsite waste disposal is low because of periodic water saturation. In some areas, the subsoil has moderately slow permeability, which reduces the soil's ability to absorb sewage effluent. If possible, all sanitary facilities should be connected to commercial sewers and treatment plants.

Capability class I.

107—Sawmill silty clay loam. This is a nearly level to depressional, poorly drained soil in large alluvial valleys and in upland drainageways. Areas are irregular in shape and range from 2 to several hundred acres in size. This soil is subject to frequent flooding for brief periods in spring.

Typically, the upper part of the surface layer is black silty clay loam about 6 inches thick, and the lower part is very dark gray and black silty clay loam about 23 inches thick. The subsoil is mottled, dark gray light silty clay loam and extends to a depth of 60 inches. In some areas, the surface layer is thinner than is typical. In places, stratified sandy material is above a depth of 60 inches. Thin layers of silty overwash are on the surface in some areas.

Included in mapping are small areas of somewhat poorly drained Orion soils and small areas of Palms muck. These soils make up about 2 to 10 percent of this map unit.

Permeability is moderate or moderately slow, and runoff in cultivated areas is slow. The available water capacity is very high. The organic matter content is high. The seasonal water table is at or near the surface. This soil is subject to occasional overflow. This soil ranges from slightly acid to mildly alkaline. The surface layer is sticky when wet, and it becomes cloddy if it is worked when wet. Seedbed preparation should be delayed until the optimum moisture content is reached.

In most areas, this soil is used for farming. If this soil is drained, it has good potential for cultivated crops and small grains. It is seldom used for hay or as pasture. It has poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, and small grains. Drainage is needed for optimum yields. In many areas, the surface is drained by ditching. Tile drainage is effective if suitable outlets are available. The use of field windbreaks and conservation tillage and returning crop residue to the soil help to reduce the loss of soil due to erosion.

This soil is poorly suited to building site development and onsite sewage disposal. Low strength is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. Onsite sewage disposal systems function poorly or fail completely because of the seasonal high water table and the seasonal flooding; these limitations are difficult to overcome. Shrinking and swelling of the soil, the high water table, and flooding are limitations to building site development.

Capability subclass IIw.

119B—Elco silt loam, 2 to 6 percent slopes. This is a gently sloping, moderately well drained soil on side slopes and head slopes along drainageways. Areas are irregular in shape and range from 5 to 20 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 6 inches thick. The subsurface layer is yellowish brown, friable silt loam about 4 inches thick. The subsoil, which formed in loess and loamy material, is about 22 inches thick. In the upper part, it is yellowish brown, friable silty clay loam, and in the lower part, it is yellowish brown, friable clay loam. Below the subsoil is an older, buried soil that is about 10 inches thick. This buried soil is dark gray, firm silty clay loam. The substratum is gray, friable clay loam to a depth of 60 inches. In some places, the surface layer is thinner, and material from the upper part of the subsoil has been mixed with the original surface layer by plowing. In places, the upper part of the subsoil has more sand than is typical.

Included in mapping are small areas of somewhat poorly drained Virgil, Kendall, Stronghurst, and Orion soils. These soils are in shallow depressions and drainageways and make up 2 to 5 percent of this map unit.

Permeability is moderate in the upper part of this soil and moderately slow in the lower part. Runoff in cultivated areas is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is strongly acid to neutral. Natural fertility is medium, but the organic matter content is moderately low due to the loss of surface soil through erosion. The available water capacity is high. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. At times, water is temporarily perched above the buried soil.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay, pasture, and

trees. It has a poor to fair potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to improve fertility, to reduce crusting, and to increase water infiltration.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. A septic tank absorption field will not function properly on this soil unless the seasonal water table is lowered or the absorption field is placed in a seepage bed above the water table. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to compensate for the slow movement of effluent. This soil is poorly suited to use as sewage lagoons because of the seasonal high water table.

Capability subclass IIe.

123—Riverwash. This map unit consists mainly of coarse, loose, sandy and gravelly soil material on natural levees along the major streams. A large amount of sand and gravel has been deposited in relatively small and irregularly shaped areas. Slopes range from nearly level to sloping. In many areas where sand and gravel are along the streambank, the size and shape of these areas change with each flood.

Permeability generally is rapid or very rapid, and the available water capacity is low or very low. The organic matter content generally is low.

In most areas, this miscellaneous area is left idle. It has poor potential for cultivated crops and hay. It has poor to fair potential for use as pasture. In some areas where this unit is part of a permanent pasture, some grass is established in the more stable areas. This unit has poor potential for most engineering uses except for use as a source of sand and gravel. It has poor potential for use as wildlife habitat and fair potential for some recreation uses, including picnicking and hiking. Paths and trails can be constructed on this unit; however, the flooding and other characteristics of this unit can temporarily interfere with outdoor recreation.

Capability subclass not assigned.

125—Selma loam. This is a nearly level, poorly drained soil in narrow upland drainageways and in broad depressions on low terraces. Areas are irregular in shape and range from 2 to 600 acres in size. This soil is subject to occasional flooding for brief periods in spring.

Typically, the upper part of the surface layer is black loam about 8 inches thick, and the lower part is black clay loam about 9 inches thick. The subsoil is 31 inches thick. In the upper part, it is dark gray, friable clay loam; in the middle part, it is gray, friable loam; and in the lower part, it is light brownish gray, friable sandy loam. The substratum, to a depth of 60 inches, is light brownish gray, calcareous loose sand. In some places, the surface layer is thinner than is typical; in some areas it is silt loam or silty clay loam. In places, the upper part of the subsoil has less sand than is typical.

Included in mapping are small areas of somewhat poorly drained La Hogue and Elburn soils. La Hogue and Elburn soils are at a slightly higher elevation on the landscape and are better drained than this Selma soil. These soils make up 10 to 15 percent of this map unit.

Permeability is moderate in the subsoil and moderately rapid in the substratum. Runoff is slow. The surface layer varies widely in reaction because of local liming practices. The subsoil is medium acid to neutral. The available water capacity and the organic matter content are high. In wet periods, the water table fluctuates between depths of 1 and 3 feet.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for small grains, hay, and pasture. It has poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. If this soil is used for cultivated crops, adequate drainage is necessary to obtain a high yield. Conservation tillage, the use of field windbreaks, and returning crop residue to the soil help to reduce the loss of soil due to erosion.

This soil is suitable for use as pastureland or hayland. Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Plantings for pasture and hay, proper stocking rates, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition.

The seasonal water table limits the use of this soil as a site for dwellings with or without a basement (fig. 6). A drainage system needs to be installed to help overcome this limitation. This soil must be protected from flooding. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. The seasonal water table and the hazard of flooding are limitations to use as sites for local roads and streets. This soil is not

suitable for use as septic tank absorption fields or for use as sewage lagoons.

Capability subclass IIw.

145B—Saybrook silt loam, 2 to 5 percent slopes. This is a gently sloping, well drained soil on convex ridgetops and knolls and broad divides on uplands. Areas are irregular in shape and range from 2 to about 200 acres in size.

Typically, the upper part of the surface layer is very dark gray friable silt loam about 9 inches thick, and the lower part is dark brown silt loam about 5 inches thick. The subsoil is about 29 inches thick. In the upper part, it is dark yellowish brown silty clay loam, and in the lower part, it is brown clay loam. The substratum, to a depth of 60 inches, is olive brown, calcareous loam. In places, the surface layer is thinner than is typical. In some places, the subsoil is deeper to calcareous material than is typical, and in some places the upper part of the subsoil has more sand.

Included in mapping are small areas of somewhat poorly drained Lisbon, Herbert, and Elburn soils. These soils are in depressions and drainageways and make up 5 to 10 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is medium acid to neutral. The available water capacity and organic matter content are high. The shrink-swell potential of the subsoil is moderate. The surface layer is friable and can be worked easily within a wide range in moisture content. The surface tends to crust, and the soil puddles after a heavy rain. The root zone is somewhat restricted below a depth of about 34 inches by the calcareous loam glacial till.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has fair potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material

Figure 6.—Excavation for a basement in an area of Selma loam. The water table is usually high, so drainage is needed.

to the soil helps to improve tilth, to reduce crusting, to increase water infiltration, and to reduce the loss of soil due to erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to compensate for the slow movement of effluent. Slope is a limitation to use as sewage lagoons. This limitation can be overcome by smoothing. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IIe.

145C2—Saybrook silt loam, 5 to 9 percent slopes, eroded. This is a sloping, well drained soil on long, convex side slopes on upland ridges. Areas are irregular in shape and range from 2 to about 40 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 8 inches thick. The subsoil is about 24 inches thick. In the upper part, it is dark yellowish brown silty clay loam, and in the lower part, it is brown clay loam. The substratum, to a depth of 60 inches, is brown, calcareous loam. In some places, the subsoil is deeper to calcareous material than is typical. In some areas, material from the subsoil has been mixed into the surface layer by plowing. In other areas, the upper part of the subsoil has more sand than is typical.

Included in mapping are small areas of somewhat poorly drained Lisbon, Herbert, and Elburn soils. These soils are in drainageways that extend into the uplands. They make up 5 to 10 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is medium. The available water capacity is high. The organic matter content is high. The shrink-swell potential of the subsoil is moderate. The surface layer varies widely in reaction because of local liming practices. The subsoil is medium acid to neutral. Some subsoil material generally is in the surface layer; thus, proper moisture content is critical to seedbed preparation. The root zone is somewhat restricted below a depth of about 30 inches by the calcareous loam glacial till.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has fair potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to improve tilth, to reduce crusting, to increase water infiltration, and to reduce the loss of soil due to erosion.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to compensate for the slow movement of effluent. This soil is not suitable for use as sewage lagoons because of the steepness of slopes.

Capability subclass IIIe.

146—Elliott silt loam. This is a nearly level, somewhat poorly drained soil on low ridges and on the upper part of side slopes on uplands. Areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is very dark grayish brown silt loam and silty clay loam about 12 inches thick. The subsoil is about 16 inches thick. In the upper part, it is very dark grayish brown, mottled, friable silty clay loam, and in the lower part, it is grayish brown, mottled, friable silty clay loam. The substratum, to a depth of 60 inches, is light brownish gray and dark yellowish brown, mottled, firm silty clay loam and brown clay loam. In some places, the depth to the substratum is more than is typical. The subsoil, in some areas, has less clay and more sand than is typical.

Included in mapping are small areas of well drained or moderately well drained Varna soils. These soils are in higher positions on the landscape and make up 5 to 10 percent of this map unit.

Permeability is moderately slow, and runoff in cultivated areas is medium. The available water capacity is moderate. In the upper part, the subsoil is medium to slightly acid; and in the lower part, it is neutral to mildly alkaline. Natural fertility and the organic matter content are high. The shrink-swell potential is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. At times, the water table is at a depth between 1 and 3 feet. The root zone is restricted below a depth of about 45 inches by the compact silty clay loam glacial till.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It

has poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. A tile drainage system helps to remove excess water. The use of field windbreaks and conservation tillage and returning crop residue to the soil help to reduce the loss of soil due to erosion.

This soil is suitable for use as pastureland or hayland. Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Plantings for pasture and hay, proper stocking rates, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition.

The seasonal water table limits the use of this soil as a site for dwellings with or without a basement. A drainage system needs to be installed to help overcome this limitation. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. A septic tank absorption field will not function properly on this soil unless the seasonal water table is lowered or the absorption field is placed in a seepage bed above the water table. This soil is poorly suited to use as sewage lagoons because of the seasonal high water table.

Capability subclass IIw.

152—Drummer silty clay loam. This is a nearly level, poorly drained soil in upland depressions and drainageways and on outwash plains and stream terraces. Areas are irregular or linear in shape and range from 2 to over 100 acres in size. This soil is subject to occasional flooding for brief periods in spring.

Typically, the upper part of the surface layer is black silty clay loam about 12 inches thick, and the lower part is very dark gray silty clay loam about 7 inches thick. The subsoil is about 29 inches thick. In the upper part, it is olive gray silty clay loam; in the middle part, it is olive gray silt loam; and in the lower part, it is olive gray loam. The substratum, to a depth of 60 inches, is mixed olive gray and yellowish brown sandy loam. In some places, the layer of silty material is thicker. In other places, the surface layer is thinner than is typical, and the subsoil is more sandy. In some areas, calcareous material is on the surface, and in other areas loamy glacial till material is in the substratum.

Included in mapping are small areas of somewhat poorly drained Elburn, Elliott, and Lisbon soils. These soils are in slightly higher positions on the landscape and make up about 5 to 15 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is slow to ponded. The subsoil is neutral to mildly alkaline. The available water capacity and organic matter content are high. The shrink-swell potential is moderate. The seasonal high water table is at or near the surface.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has poor potential for building site development and as sites for sanitary facilities.

This soil is well suited to corn and soybeans and to use as pasture. Drainage is needed for optimum yields. Tile drains are effective if suitable outlets are available. The use of field windbreaks and conservation tillage and returning crop residue to the soil help to reduce erosion.

The seasonal water table limits the use of this soil as a site for dwellings with or without a basement. A drainage system needs to be installed to help overcome this limitation. Low strength is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. This soil needs to be protected from possible flooding. The high seasonal water table and flooding are hazards that are difficult to overcome. This soil is not suitable for onsite sanitary facilities.

Capability subclass IIw.

172—Hoopeston sandy loam. This is a nearly level, somewhat poorly drained soil on low, loamy and sandy terraces along the major streams and in depressions. Areas are irregular in shape and range from 5 to 80 acres in size.

Typically, the surface layer is very dark brown, friable sandy loam about 12 inches thick. The subsoil is about 16 inches thick. In the upper part, it is grayish brown, very friable sandy loam, and in the lower part, it is yellowish brown, very friable light sandy loam. The substratum, to a depth of 38 inches, is pale brown, loose light loamy sand. Below that, it is light olive gray, dark grayish brown, yellowish brown, and pale brown stratified fine sand, loamy sand, sandy loam, and loam to a depth of 60 inches. In some places, the surface layer is thinner than is typical. In other places, the subsoil has more clay.

Included in mapping are small areas of poorly drained Selma soils in depressions and drainageways. Also included are small areas of well drained Flagler soils on ridges and in slightly elevated positions. Selma and Flagler soils make up 5 to 10 percent of this map unit.

Permeability is moderately rapid in the subsoil and rapid in the substratum. Runoff in cultivated areas is slow. The available water capacity is moderate. The organic matter content is moderate. The subsoil is slightly acid to strongly acid. The surface layer is easy to till. The water table is between depths of 1 and 3 feet in spring. This soil is droughty late in summer.

In most areas, this soil is used for farming. It has fair potential for cultivated crops and good potential for hay and pasture. It has poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Unless this soil is adequately drained, the seasonal high water table hinders seeding

operations. Tile drainage is not effective because this soil is too sandy. Droughtiness is a limitation during the drier summer months. Soil blowing causes excessive loss of soil. The use of field windbreaks and conservation tillage and returning crop residue to soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to improve fertility and tilth.

This soil is suitable for use as pastureland or hayland. Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Plantings for pasture and hay, proper stocking rates, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition.

The seasonal water table limits the use of this soil as a site for dwellings with or without a basement. A drainage system needs to be installed to help overcome this limitation. Susceptibility to frost action is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. A septic tank absorption field will not function properly on this soil unless the seasonal water table is lowered or the absorption field is placed in a seepage bed above the water table. There is a hazard of ground water contamination because of seepage. This soil is not suitable for use as sewage lagoons because of seepiness and the seasonal high water table.

Capability subclass IIIs.

188—Beardstown loam. This is a nearly level to very gently sloping, somewhat poorly drained soil at the upper end of upland drainageways, on outwash plains, and on terraces along the Pecatonica and Piscasaw Rivers. Areas are irregular in shape and range from 2 to 100 acres in size.

Typically, the surface layer is very dark grayish brown loam about 8 inches thick. The subsurface layer is grayish brown loam that has yellowish brown mottles; it is about 5 inches thick. The subsoil is about 31 inches thick. In the upper part, it is mottled, grayish brown and brown sandy clay loam, and in the lower part, it is mottled, dark yellowish brown and dark grayish brown sandy loam. The substratum, to a depth of 60 inches, is dark yellowish brown and brown stratified loamy sand, sandy loam, and loam. In some areas, the surface layer is lighter colored than is typical, and in other areas, it is more than 10 inches thick. In some areas, the soil material in the upper part of the profile has more silt than is typical. In cultivated areas, the subsurface layer has been mixed with the surface layer by plowing. In some places, the substratum is more sandy than is typical and is at a depth of less than 40 inches. In some areas, this soil is poorly drained.

Included in mapping are small areas of well drained Jasper and Martinsville soils. These soils are in higher, convex areas and make up 2 to 10 percent of this map unit.

Permeability is moderate or moderately slow in the subsoil and moderately rapid in the substratum. Runoff in cultivated areas is slow to medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to strongly acid. The available water capacity is high, and the organic matter content is moderate. The surface layer is friable and can be worked easily within a wide range in moisture content. The seasonal water table is between depths of 1 and 3 feet.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay, pasture, and trees. It has poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Conservation tillage and returning crop residue to the soil help to reduce the loss of soil due to erosion. Returning crop residue or adding other organic material to the soil helps to improve fertility, to reduce crusting, and to increase water intake. Proper placement of field drainage tile can help to overcome the seasonal high water table and wetness limitations.

The seasonal water table limits the use of this soil as a site for dwellings with or without a basement. A drainage system needs to be installed to help overcome this limitation. Susceptibility to frost action is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. A septic tank absorption field will not function properly on this soil unless the seasonal water table is lowered or the absorption field is placed in a seepage bed above the water table. This soil is not suitable for use as sewage lagoons because of seepiness and the seasonal high water table.

Capability subclass IIw.

197—Troxel silt loam. This is a nearly level, well drained soil in small drainageways and on foot slopes on uplands and in closed depressions on stream terraces. Areas are irregular in shape and range from 2 to 60 acres in size. This soil is subject to occasional flooding for very brief periods in spring.

Typically, the upper part of the surface layer is black silt loam about 22 inches thick, and the lower part is dark brown silt loam about 9 inches thick. The subsoil generally extends to a depth of more than 60 inches. In the upper part, it is brown, friable silty clay loam, and in the lower part, it is yellowish brown, friable silt loam. The substratum is yellowish brown silt loam. In some areas, the surface layer is less than 24 inches thick. In a few areas, this soil is loamy. In some areas, this soil does not have a substratum.

Included in mapping are small areas of somewhat poorly drained Muscatine soils and poorly drained Sable

soils. These soils are in shallow depressions and make up 2 to 8 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is slow to ponded. This soil ranges from neutral to slightly acid, and the surface layer generally is neutral. The available water capacity is very high. The organic matter content is high. The shrink-swell potential is moderate in the subsoil. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content.

In most areas, this soil is used for farming or is in grassed waterways. It has good potential for cultivated crops and for hay and pasture. It has poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Conservation tillage and returning crop residue to the soil help to reduce the loss of soil due to erosion.

This soil is poorly suited to building site development and as sites for onsite waste disposal because it is subject to stream overflow and temporary ponding. Floodwaters need to be diverted from building sites. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material.

Capability class I.

198—Elburn silt loam. This is a nearly level, somewhat poorly drained soil on terraces and in low areas on uplands. Areas are irregular in shape and range from 2 to 150 acres in size.

Typically, the upper part of the surface layer is black silt loam about 15 inches thick, and the lower part is very dark gray silt loam about 3 inches thick. The subsoil is about 33 inches thick. In the upper part, it is dark grayish brown to light olive brown silty clay loam, and in the lower part, it is grayish brown silt loam. The substratum, to a depth of 60 inches, is brown loamy sand. In a few areas, the surface layer is thinner than is typical. In places, the sandy underlying material is at a greater depth.

Included in mapping are small areas of poorly drained Drummer and Sable soils. These soils do not have a sandy substratum. Sable and Drummer soils are saturated with water for a longer period than this Elburn soil. These soils are in small depressions and make up 5 to 10 percent of this map unit.

Permeability is moderate in the subsoil and moderately rapid in the substratum. Runoff is slow. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to slightly acid. The available water capacity and the organic matter content are high. The seasonal water table fluctuates near the surface.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Drainage may be needed in some areas. A tile drainage system is effective. If the soil is worked when wet, the surface layer compacts and the soil structure deteriorates.

This soil is suitable for use as pastureland or hayland. Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Plantings for pasture and hay, proper stocking rates, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition.

The seasonal water table limits the use of this soil as a site for dwellings with or without a basement. A drainage system needs to be installed to help overcome this limitation. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. A septic tank absorption field will not function properly on this soil unless the seasonal water table is lowered or the absorption field is placed in a seepage bed above the water table. This soil is not suitable for use as sewage lagoons because of seepiness and the seasonal high water table. If possible, all sanitary facilities need to be connected to commercial sewers.

Capability class I.

199A—Plano silt loam, 0 to 2 percent slopes. This is a nearly level, well drained soil on broad upland divides and on terraces along streams. Areas are linear in shape and range from 5 to 60 acres in size.

Typically, the upper part of the surface layer is very dark brown silt loam about 9 inches thick, and the lower part is very dark grayish brown and dark brown silt loam about 11 inches thick. The subsoil is about 41 inches thick. In the upper part, it is dark brown, friable silty clay loam, and in the lower part, it is dark yellowish brown, very friable sandy loam. In some places, the layer of silty material is thinner than is typical, and the outwash material is closer to the surface. In some areas, the surface layer is less than 10 inches thick. In areas where this soil is in depressions and drainageways, the surface layer is thicker. In some areas, the outwash material is at a depth of more than 60 inches.

Included in mapping are small areas of somewhat poorly drained Elburn soils in shallow depressions and drainageways. Elburn soils make up 5 to 10 percent of this map unit.

Permeability is moderate in the upper part of the soil and moderately rapid in the lower part. Runoff is medium in cultivated areas. This soil varies in reaction from medium acid to neutral. The available water capacity is high. The organic matter content and natural fertility are high. The surface layer is friable, and seedbed preparation is easy. The shrink-swell potential in the subsoil is moderate.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for use as pasture. It has fair to good potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Conservation tillage and returning crop residue to the soil help to reduce the loss of soil due to erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability class I.

199B—Plano silt loam, 2 to 5 percent slopes. This is a gently sloping, well drained soil on upland divides, interfluves, and side slopes. Areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the upper part of the surface layer is very dark brown silt loam about 7 inches thick, and the lower part is dark brown silt loam about 6 inches thick. The subsoil is about 40 inches thick. In the upper part, it is dark brown, firm silty clay loam, and in the lower part, it is dark yellowish brown sandy loam. The substratum is dark yellowish brown sandy loam. In some areas, the surface layer is less than 10 inches thick. In places, the layer of silty material is thinner than is typical, and the outwash material is closer to the surface. In some areas, the outwash material is at a depth of more than 60 inches. In places, a clay loam paleosol is between depths of 40 and 60 inches.

Included in mapping are small areas of somewhat poorly drained Elburn soils. Elburn soils are in shallow depressions and drainageways and make up about 5 to 10 percent of this map unit.

Permeability is moderate in the upper part of this soil and moderately rapid in the lower part. Runoff is medium. This soil varies in reaction from medium acid to neutral. The available water capacity is high. The surface layer is friable, and a seedbed can be easily prepared. The organic matter content and natural fertility are high. The shrink-swell potential in the subsoil is moderate.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for use as pasture. It has fair to good potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. Slope is a limitation for sewage lagoons; this limitation can be overcome by smoothing. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water. This soil is well suited to use as septic tank absorption fields.

Capability subclass IIe.

199C2—Plano silt loam, 5 to 9 percent slopes, eroded. This is a sloping, well drained soil on upland side slopes and terrace breaks. Areas are linear in shape and range from 2 to 20 acres in size.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsoil is about 38 inches thick. In the upper part, it is dark brown, firm silty clay loam, and in the lower part, it is dark brown, friable silty clay loam. The substratum, to a depth of 60 inches, is yellowish brown, friable sandy loam. In some places, the silty material is thinner than is typical, and the outwash material is closer to the surface. In places, a clay loam paleosol is between depths of 40 and 60 inches. In a few places, the surface layer is dark brown silty clay loam.

Included in mapping are small areas of somewhat poorly drained Elburn soils. Elburn soils are in drainageways and make up 2 to 10 percent of this map unit. Also included are small areas of Ashdale soils that have bedrock at a depth between 40 and 60 inches. Ashdale soils are on slopes along streams and rivers and make up 2 to 5 percent of this map unit.

Permeability is moderate in the upper part of this soil and moderately rapid in the lower part. Runoff is medium. The available water capacity is high. The surface layer is friable, and a seedbed can be prepared easily. The organic matter content and natural fertility are high. The shrink-swell potential in the subsoil is moderate.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for use as pasture. It has fair to good potential for building site development and for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion.

This soil is suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep

pasture and soil in good condition and help to control erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields. Slope is a limitation to use as sewage lagoons. This limitation can be overcome by smoothing.

Capability subclass IIIe.

221B—Parr silt loam, 2 to 5 percent slopes. This is a gently sloping, well drained soil on low ridges and convex side slopes. Areas are irregular in shape and range from 2 to more than 100 acres in size.

Typically, the upper part of the surface layer is very dark grayish brown silt loam about 12 inches thick, and the lower part is mixed, very dark grayish brown and dark grayish brown silt loam about 7 inches thick. The subsoil is about 17 inches thick. In the upper part, it is dark yellowish brown, friable clay loam, and in the lower part, it is brown, friable clay loam. The substratum, to a depth of about 60 inches, is light yellowish brown, calcareous loam. In some areas, the substratum is light yellowish brown, calcareous sandy loam, clay loam, or silty clay loam. In a few areas, the substratum is light yellowish brown stratified sandy loam, loamy sand, or sand.

Included in mapping are small areas of somewhat poorly drained Odell soils and poorly drained Selma soils. These soils are in shallow depressions and drainageways and make up 2 to 8 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is medium. The surface layer generally is neutral, depending on the local liming practices. The subsoil is neutral to slightly acid. The available water capacity is moderate. The organic matter content is moderate. The shrink-swell potential of the subsoil is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. If this soil is worked when wet, the surface tends to crust or the soil puddles. The root zone is restricted below a depth of about 36 inches by the compact loamy glacial till.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has fair potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to improve fertility, to reduce crusting, and to increase water infiltration.

This soil is suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome be replacing the base material. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to compensate for the slow movement of effluent. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IIe.

221C2—Parr silt loam, 5 to 9 percent slopes, eroded. This is a sloping, well drained soil on convex side slopes. Areas are irregular in shape and range from 2 to 90 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 8 inches thick. The subsoil is about 17 inches thick. In the upper part, it is dark yellowish brown, friable clay loam, and in the lower part it is brown, friable clay loam. The substratum, to a depth of about 60 inches, is light yellowish brown, calcareous loam. In some areas, the substratum is light yellowish brown, calcareous sandy loam, clay loam, or silty clay loam. In a few areas, the substratum is light yellowish brown, stratified sandy loam, loamy sand, or sand. In other areas, where material from the upper part of the subsoil has been mixed with the original surface layer by plowing, the present surface layer is dark yellowish brown clay loam.

Included in mapping are small areas of somewhat poorly drained Odell soils. Odell soils are in small drainageways that extend into areas of this Parr soil. These soils make up 2 to 4 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is medium to rapid. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to slightly acid. The available water capacity and the organic matter content are moderate. The shrink-swell potential of the subsoil is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. If this soil is worked when wet, the surface tends to crust or the soil puddles. The

root zone is restricted by compact, loamy glacial till at a depth of about 27 inches.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has fair to poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce the loss of soil due to erosion. Returning crop residue or adding other organic material to the soil helps to improve fertility, reduce crusting, and increase water infiltration.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to compensate for the slow movement of effluent. Slopes need to be shaped considerably if sewage lagoons are constructed on this soil.

Capability subclass IIIe.

223B—Varna silt loam, 2 to 6 percent slopes. This is a deep, gently sloping, moderately well drained soil on convex ridgetops and side slopes. Areas are irregular in shape and range from 2 to 300 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 10 inches thick. The subsoil is brown, friable silty clay loam about 25 inches thick. The substratum, to a depth of about 60 inches, is mixed grayish brown and yellowish brown, calcareous silty clay loam. In some places, the subsoil is deeper to calcareous silty clay loam than is typical. In some eroded areas, the surface layer is less than 10 inches thick, and in other areas the subsoil has more sand.

Included in mapping are small areas of somewhat poorly drained Elliott and Andres soils in slight depressions and drainageways. These soils make up 2 to 5 percent of this map unit.

Permeability is moderately slow in the subsoil and slow in the substratum. Runoff in cultivated areas is medium. The surface layer varies widely in reaction because of local liming practices. Typically, the subsoil is neutral in the upper part and moderately alkaline in the lower part. The available water capacity is high. The organic matter content is high. The shrink-swell potential of the subsoil is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. If the soil is eroded, the surface tends to crust or the soil puddles after a hard rain. The root zone is restricted by compact, silty clay loam till at a depth of about 36 inches.

In most areas, this soil is used for farming (fig. 7). It has good potential for cultivated crops and hay. It has fair potential for building site development. It has poor potential for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to improve fertility, to reduce crusting, and to increase water infiltration.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. A septic tank absorption field will not function properly on this soil unless the seasonal water table is lowered or the absorption field is placed in a seepage bed above the water table. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to compensate for the slow movement of effluent. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing.

Capability subclass IIe.

227B—Argyle silt loam, 2 to 6 percent slopes. This is a gently sloping, well drained soil on long, narrow, convex ridgetops and on long upland side slopes. Areas are linear in shape and range from 2 to 100 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 8 inches thick. The subsoil extends to a depth of 62 inches. In the upper part, to a depth of 24 inches, the subsoil is dark yellowish brown silty clay loam. Below that, to a depth of about 62 inches, it is dark yellowish brown, yellowish red, strong brown, and reddish brown clay loam. In some places, the subsoil is

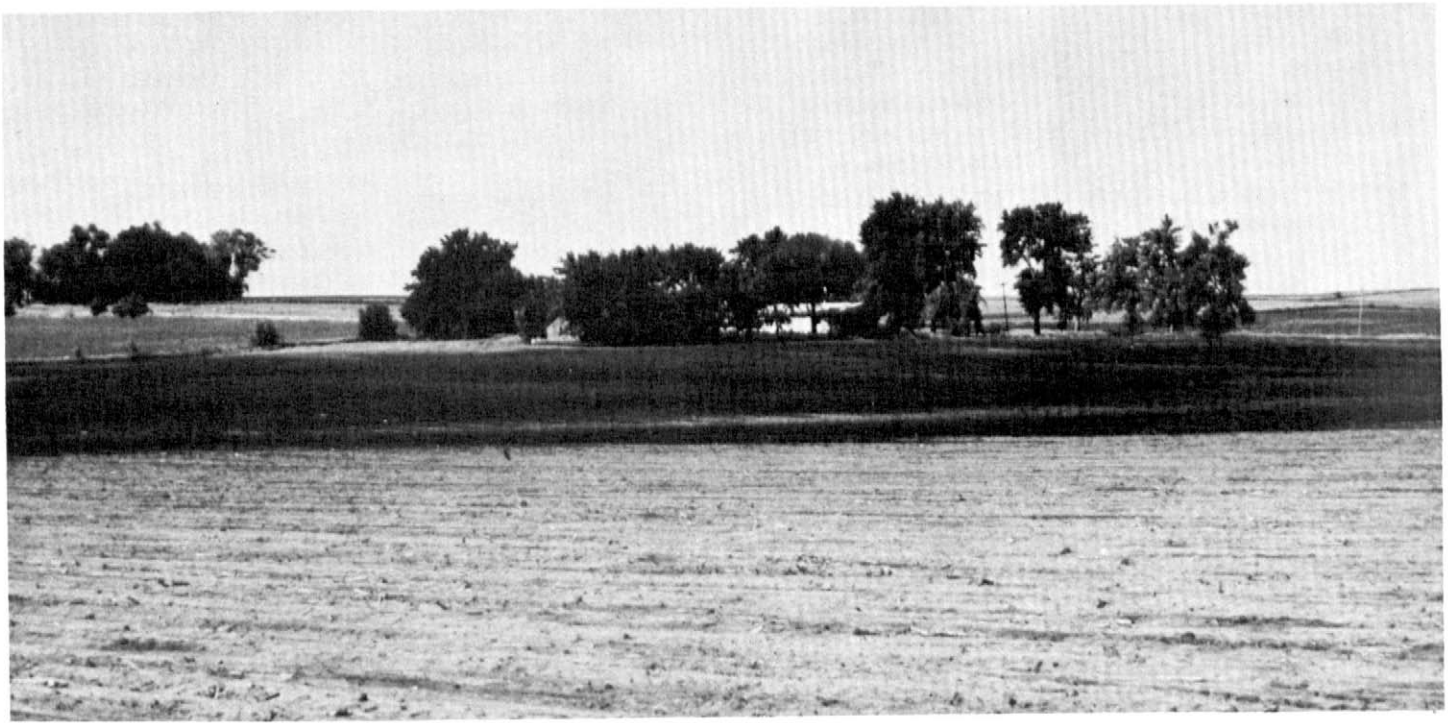


Figure 7.—Varna silt loam, in the foreground, is a moderately well drained soil that is used mainly for farming. Somewhat poorly drained Odell silt loam and poorly drained Drummer silty clay loam are in the background.

thinner than is typical. In a few places, the surface layer is more than 8 inches thick.

Included in mapping are small areas of moderately deep Whalan, NewGlarus, Rockton, and Dodgeville soils. These soils are in areas similar to those of this Argyle soil, but they have fractured limestone bedrock between depths of 20 and 40 inches. These soils make up 2 to 15 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to strongly acid. The organic matter content is moderate, and the available water capacity is high. The shrink-swell potential of the subsoil is moderate. The surface layer is friable and can be tilled easily within a wide range in moisture content.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for small grains, hay, and pasture. It has fair to good potential for building site development and as sites for sanitary facilities.

This soil is well suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion. Returning crop residue to the soil helps to improve fertility, reduce crusting, and increase water infiltration.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IIe.

242—Kendall silt loam. This is a nearly level, somewhat poorly drained soil on the lower part of concave slopes and at the upper end of drainageways on uplands. Areas are irregular in shape and range from 2 to over 100 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 9 inches thick. The subsurface layer is grayish brown silt loam about 3 inches thick. The subsoil is

about 41 inches thick. In the upper part, the subsoil is grayish brown and yellowish brown, friable silty clay loam, and in the lower part, it is yellowish brown and gray, friable silt loam that has a noticeable amount of sand. The substratum, to a depth of about 60 inches, is yellowish brown and grayish brown sandy loam. In some areas, the surface layer is very dark grayish brown silt loam. In a few areas, the subsoil is thinner and the underlying material is nearer to the surface. In some places, the substratum is light olive brown, calcareous loam. In some areas, the lower part of the subsoil is pale brown, calcareous silt loam.

Included in mapping are small areas of well drained St. Charles soils and poorly drained Drummer soils. St. Charles soils are on mounds and slight rises, and Drummer soils are in shallow depressions and drainageways. These soils make up 2 to 10 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is slow. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to strongly acid. The available water capacity is high. The organic matter content is moderately low. The shrink-swell potential of the subsoil is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. If the soil is worked when wet, the surface tends to crust, or the soil puddles after a hard rain.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay, pasture, and trees. It has good potential for use as habitat for woodland wildlife. It has poor potential for building site development and as sites for sanitary facilities.

This soil is well suited to corn, soybeans, small grains, and grasses and legumes. Tile drainage can be used to drain this soil if suitable outlets are available. Conservation tillage and returning crop residue to the soil help to reduce the loss of soil due to erosion. Returning crop residue or adding other organic material to the soil helps to improve fertility and reduce crusting.

This soil is suitable for use as pastureland or hayland. However, overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Plantings for pasture and hay, proper stocking rates, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition.

This soil is well suited to use as woodland. A few areas remain in native hardwoods. Tree seedlings survive and grow well if competing vegetation is controlled or removed. The only concern when planting or harvesting trees is the seasonal high water table.

The seasonal water table limits the use of this soil as a site for dwellings with or without a basement. A drainage system needs to be installed to help overcome this limitation. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. A septic tank absorption field will not function properly on this soil unless the seasonal water table is lowered or the absorption field is placed in a seepage bed above the water table. The soil is not suitable for use as sewage lagoons because of the seasonal high water table.

Capability subclass IIw.

243A—St. Charles silt loam, 0 to 2 percent slopes. This is a nearly level, well drained soil on upland drainage divides, foot slopes, and stream terraces. Areas are irregular in shape and range from 2 to more than 100 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 10 inches thick. The subsurface layer is brown, friable silt loam about 4 inches thick. The subsoil extends to a depth of 60 inches. In the upper part, it is brown and yellowish brown silty clay loam, and in the lower part, it is dark yellowish brown and yellowish brown clay loam and sandy clay loam. In some places, within a depth of 5 feet, gravel is in the lower part of the subsoil and in the substratum. In some areas, the subsoil formed in silty material. In other areas, the upper part of the subsoil has more sand than is typical. In some places, reddish glacial material is in the lower part of the subsoil.

Included in mapping are small areas of somewhat poorly drained Kendall and Stronghurst soils and poorly drained Drummer soils. These soils are in drainageways and in lower positions on the landscape and make up about 5 to 10 percent of this map unit.

Permeability is moderate, and runoff is medium. The available water capacity is high, and the organic matter content is moderately low. The surface layer varies widely in reaction because of local liming practices. The subsoil is medium acid to neutral. The shrink-swell potential of the subsoil is moderate. The surface layer is friable and can be worked easily within a fairly wide range in moisture content. After a hard rain, the surface tends to crust, or the soil puddles. The hazard of frost action is high.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay, pasture, and trees. It has fair to good potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Conservation tillage and returning crop residue to the soil help to reduce the loss of soil due to erosion. Returning crop residue or adding other organic material to the soil helps to improve tilth and reduce crusting.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil

for local roads and streets. These limitations can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability class I.

243B—St. Charles silt loam, 2 to 5 percent slopes. This is a gently sloping, well drained soil on upland divides, on foot slopes, and on stream terraces. Areas are irregular in shape and range from about 2 to 80 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 10 inches thick. The subsurface layer is brown silt loam about 3 inches thick. The subsoil is about 45 inches thick. In the upper part, it is brown and yellowish brown silty clay loam, and in the lower part, it is dark yellowish brown and yellowish brown clay loam and sandy clay loam. The substratum, to a depth of 60 inches, is yellowish brown, stratified loam, silt loam, and sandy loam. In some places, within a depth of 60 inches, gravel is in the lower part of the subsoil and in the substratum. In places, the upper part of the subsoil has more sand than is typical. In some areas, the subsoil formed in silty material. In some places, reddish glacial material is in the lower part of the subsoil.

Included in mapping are small areas of somewhat poorly drained Kendall and Stronghurst soils and poorly drained Drummer soils. These soils are in drainageways. They make up 5 to 10 percent of the unit.

Permeability is moderate, and runoff is medium. The available water capacity is high, and the organic matter content is moderately low. The surface layer varies widely in reaction because of local liming practices. The subsoil is medium acid to neutral. The shrink-swell potential of the subsoil is moderate. The surface layer is friable and can be worked easily within a fairly wide range in moisture content. However, the surface tends to crust, or the soil puddles after a hard rain. The hazard of frost action is high.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay, pasture, and trees. It has fair to good potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to improve tilth, to reduce crusting, and to improve water infiltration.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IIe.

243C2—St. Charles silt loam, 5 to 9 percent slopes, eroded. This is a sloping, well drained soil on side slopes of upland ridges and on breaks of stream terraces. Areas are irregular in shape and range from 2 to about 80 acres in size.

Typically, the surface layer is dark grayish brown and brown silt loam about 7 inches thick. The subsoil is about 40 inches thick. In the upper part, the subsoil is brown and yellowish brown silty clay loam, and in the lower part, it is dark yellowish brown and yellowish brown clay loam and sandy clay loam. The substratum, to a depth of 60 inches, is yellowish brown stratified loam, silt loam, and sandy loam. In some places, within a depth of 60 inches, gravel is in the lower part of the subsoil and in the substratum. In places, the upper part of the subsoil has more sand than is typical; in some areas, the subsoil formed entirely in silty material. In places, calcareous material is within a depth of 40 inches. In cultivated areas, material from the upper part of the subsoil has been mixed into the surface layer by plowing.

Included in mapping are small areas of somewhat poorly drained Stronghurst, Kendall, and Orion soils and poorly drained Comfrey soils. These soils are in drainageways and make up 5 to 10 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is medium. The available water capacity is high, and the organic matter content is moderately low. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to strongly acid. The shrink-swell potential of the subsoil is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. However, the surface tends to crust, or the soil puddles after a hard rain, particularly in areas where subsoil material has been mixed into the plow layer.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay, pasture, and trees. It has fair potential for building site development and good potential for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce the loss of soil due to erosion. Returning crop residue or adding other organic material to the soil helps to improve fertility, reduce crusting, and increase water infiltration.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing.

Capability subclass IIIe.

259B2—Assumption silt loam, 2 to 6 percent slopes, eroded. This is a gently sloping, moderately well drained soil in depressions at the head of drainageways on uplands. Areas are linear or oblong in shape and range from 2 to 20 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 8 inches thick. The subsoil is about 20 inches thick. In the upper part, it is brown, friable silty clay loam, and it grades to brown, friable silt loam in the lower part. The subsoil is underlain by a buried soil at a depth between 20 and 40 inches. In the upper part, the buried soil is grayish brown and very dark grayish brown loam; and in the lower part, it is mottled, light brownish gray, firm loam. In some places, the subsoil has more sand than is typical. In others, reddish-colored glacial material is in the lower part of the subsoil. In some areas, slopes are less than 2 percent; in other areas, they are more than 6 percent.

Included in mapping are small areas of somewhat poorly drained Muscatine and Atterberry soils in shallow depressions and drainageways. These soils make up 2 to 10 percent of this map unit.

Permeability is moderate in the upper part of this soil and moderately slow in the lower part. Runoff in cultivated areas is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to medium acid. The available water capacity is high. The organic matter content is moderate because of the loss of surface soil through erosion. The shrink-swell potential of the subsoil and buried soil is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. However, the surface layer tends to crust, or the soil puddles after a hard rain, particularly in areas where subsoil material has been mixed into the plow layer.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture It has fair to poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to improve fertility, to reduce crusting, and to increase the rate of water intake.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. The seasonal water table limits the use of this soil as a site for dwellings that have a basement. A drainage system needs to be installed to help overcome this limitation. A septic tank absorption field will not function properly on this soil unless the seasonal water table is lowered or the absorption field is placed in a seepage bed above the water table. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to compensate for the slow movement of effluent. In places, the perched water table is a limitation for sewage lagoons. This limitation can be overcome by special design, for example, one that includes a drainage system.

Capability subclass IIe.

278—Stronghurst silt loam. This is a nearly level, somewhat poorly drained soil on upland drainage divides and on outwash plains. Areas are irregular in shape and range from 2 to more than 200 acres in size.

Typically, the surface layer is dark gray silt loam about 9 inches thick. The subsurface layer is grayish brown silt loam about 3 inches thick. The subsoil is about 38 inches thick. In the upper part, the subsoil is grayish brown, friable silty clay loam; in the middle part, it is mottled, yellowish brown and light grayish brown, friable silty clay loam; and in the lower part, it is yellowish brown, light brownish gray, and dark gray, friable silt loam. The substratum, to a depth of about 60 inches, is light brownish gray and yellowish brown silt loam. In some areas, the surface layer is darker than is typical. In other areas, the lower part of the subsoil and the substratum has more sand.

Included in mapping are small areas of well drained Fayette soils, moderately well drained Rozetta soils, and poorly drained Sable soils. Fayette and Rozetta soils are on mounds and slight rises, and Sable soils are in shallow depressions and drainageways. These soils make up 2 to 10 percent of this map unit.

Permeability is moderate or moderately slow. Runoff in cultivated areas is slow. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to medium acid. The available water capacity is very high. The organic matter content is moderately low. The seasonal high water table is within a depth of 1 to 3 feet. The shrink-swell potential is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. If this soil is worked when wet, the surface tends to crust, or the soil puddles after a hard rain.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay, pasture, and trees. It has poor potential for building site development and as sites for sanitary facilities.

This soil is well suited to corn, soybeans, wheat, oats, and legumes and grasses. Tile drainage is effective if suitable outlets are available. This soil also can be drained using surface ditches. Returning crop residue and adding other organic material to the soil help to improve fertility and tilth.

This soil is moderately suited to use as woodland, and in a few small areas, it is in native hardwoods. Tree seedlings that are adapted to this somewhat poorly drained soil survive and grow well if competing vegetation is controlled or removed.

The seasonal water table limits the use of this soil as a site for dwellings with or without a basement. A drainage system needs to be installed to help overcome this limitation. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. A septic tank absorption field will not function properly on this soil unless the seasonal water table is lowered or the absorption field is placed in a seepage bed above the water table. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to compensate for the slow movement of effluent. This soil is not suitable for use as sewage lagoons because of the seasonal high water table.

Capability subclass IIw.

279A—Rozetta silt loam, 0 to 3 percent slopes. This is a nearly level, moderately well drained soil on broad upland drainage divides and on stream terraces. Areas are irregular in shape and range from 2 to about 100 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 7 inches thick. The subsurface layer is brown, friable silt loam about 3 inches thick. The subsoil extends to a depth of 60 inches. In the upper part, it is yellowish brown silty clay loam, and in the lower part, it is mixed dark yellowish brown, brown, and pale brown silt loam. In some places, the subsurface layer has been mixed with the surface layer by plowing. In places, stratified sandy material or reddish-colored glacial drift is within a depth of 60 inches.

Included in mapping are small areas of somewhat poorly drained Stronghurst and Atterberry soils in shallow depressions and drainageways. These soils make up 2 to 10 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is slow to medium. The available water capacity is high, and the organic matter content is moderately low. The shrink-swell potential of the subsoil is moderate. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to strongly acid. The surface layer is friable and can be worked easily within a wide range in moisture content. However, the surface tends to crust, or the soil puddles after a hard rain. The hazard of frost action is high.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for small grains, hay, pasture, and trees. It has fair to poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Conservation tillage and returning crop residue to the soil help to reduce the loss of soil due to erosion. Returning crop residue or adding other organic material to the soil helps to improve tilth, reduce crusting, and increase water infiltration.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. The seasonal water table limits the use of this soil as a site for dwellings that have a basement. A drainage system needs to be installed to help overcome this limitation. A septic tank absorption field will not function properly on this soil unless the seasonal water table is lowered or the absorption field is placed in a seepage bed above the water table. This soil is not suitable for use as sewage lagoons because of the seasonal high water table.

Capability class I.

280B—Fayette silt loam, 2 to 5 percent slopes. This is a gently sloping, well drained soil on convex ridgetops

and knolls and on foot slopes on uplands and terraces. Areas are irregular in shape and range from 2 to 200 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsurface layer is mixed grayish brown and yellowish brown silt loam about 3 inches thick. The subsoil is yellowish brown silty clay loam and silt loam about 48 inches thick. The substratum, to a depth of 60 inches, is yellowish brown silt loam that has prominent gray mottles. In some places, gray mottles are above a depth of 30 inches. In some areas, stratified sandy material or clay loam glacial material is within a depth of 60 inches. In places, calcareous material is within a depth of 40 inches.

Included in mapping are small areas of somewhat poorly drained Stronghurst and Atterberry soils in shallow depressions and drainageways. These soils make up 2 to 5 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is medium. The available water capacity is high. The organic matter content is moderately low. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to strongly acid. The shrink-swell potential of the subsoil is moderate. The surface layer is friable and can be worked easily within a wide range in moisture content. However, the surface tends to crust, or the soil puddles after a hard rain.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay, pasture, and trees. It has fair potential for building site development and for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of conservation tillage, and returning crop residue to the soil help to reduce the loss of soil due to erosion. Returning crop residue or adding other organic material to the soil helps to improve fertility, reduce crusting, and increase water infiltration.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil is well suited to use as woodland, and in a few areas it is in native hardwoods. Tree seedlings survive and grow well if competing vegetation is controlled or removed. There are few hazards or limitations to planting or harvesting trees.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to compensate for the slow movement of effluent. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IIe.

280C2—Fayette silt loam, 5 to 9 percent slopes, eroded. This is a sloping, well drained soil on upland ridges and side slopes and on stream terraces. Areas are linear or irregular in shape and range from 2 to 60 acres in size.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil is about 40 inches thick. In the upper part, it is yellowish brown silty clay loam, and in the lower part, it is yellowish brown silt loam. The substratum, to a depth of 60 inches, is yellowish brown silt loam that has prominent gray mottles. In some places, gray mottles are within a depth of 30 inches. In places, the surface layer is thinner than is typical because it has been eroded. In cultivated areas, material from the subsoil has been mixed into the surface layer by plowing. In areas where this soil is in woodland, the surface layer commonly is thicker than is typical. In places, stratified material, clay loam glacial material, or bedrock is within a depth of 60 inches. In some areas, calcareous material is within a depth of 40 inches. In some areas, slopes are more than 9 percent.

Included in mapping are small areas of somewhat poorly drained Stronghurst and Atterberry soils and poorly drained Comfrey soils. These soils are in drainageways. These soils make up 5 to 10 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is medium. The available water capacity is high, and the organic matter content is moderately low. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to strongly acid. The shrink-swell potential of the subsoil is moderate. The surface tends to crust, or the soil puddles after a hard rain.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay, pasture, and trees. It has fair to poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. The use of conservation tillage, contour farming, or terraces helps to make an intensive cropping system feasible and help to reduce soil loss. Growing winter cover crops and returning crop residue or adding other organic material to the soil help to improve fertility and to reduce crusting and erosion.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes

surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil is well suited to use as woodland. In a few areas, it is in native hardwoods. Tree seedlings survive and grow well if competing vegetation is controlled or removed. There are few hazards to planting or harvesting trees.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to compensate for the slow movement of effluent. This soil is not suitable as a site for sewage lagoons because of seepiness and the steepness of slopes.

Capability subclass IIIe.

290A—Warsaw loam, 0 to 2 percent slopes. This is a nearly level, well drained soil on terraces. Areas are irregular in shape and range from 3 to several hundred acres in size.

Typically, the surface layer is very dark grayish brown loam about 12 inches thick. The subsoil is about 24 inches thick. In the upper part, it is very dark grayish brown loam; in the middle part, it is brown loam; and in the lower part, it is dark reddish brown gravelly loam. The substratum, to a depth of 60 inches, is yellowish brown, calcareous sand and gravel. In some places, the subsoil is deeper to sand and gravel than is typical. In a few areas, the surface layer is very dark gray sandy loam or loamy sand, and the soil has a subsurface layer of dark grayish brown loam. In some areas, the substratum has more clay than is typical.

Permeability is moderate in the upper part of the soil and rapid in the lower part. Runoff in cultivated areas is slow. The surface layer varies widely in reaction because of local liming practices. The subsoil is slightly acid to neutral. The available water capacity is moderate. The organic matter content is moderate. The surface layer is friable and can be tilled easily within a wide range in moisture content. The root zone is restricted by calcareous sand and gravel below a depth of about 36 inches.

In most areas, this soil is used for farming. It has good potential for cultivated crops and hay. This soil has good potential for recreation uses. It has good to fair potential for building site development and as sites for septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Conservation tillage and returning crop residue to the soil help to reduce erosion.

This soil is well suited to recreation uses. It has slight limitations for camp areas, picnic areas, playgrounds, and paths and trails.

This soil is moderately suited to building site development. Low strength and frost action are limitations in using this soil as sites for local roads and streets and for buildings. These limitations can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields, but the effluent can contaminate ground water because of seepage. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water. This soil is well suited to use as a source of sand, gravel, and topsoil.

Capability subclass IIs.

290B—Warsaw loam, 2 to 5 percent slopes. This is a gently sloping, well drained soil on convex ridges, outwash plains, gravelly kames, and stream terraces. Areas are irregular in shape and range from 2 to 80 acres in size.

Typically, the surface layer is very dark gray and very dark grayish brown loam about 10 inches thick. The subsoil is about 41 inches thick. In the upper part, it is very dark grayish brown, friable loam; in the middle part, it is brown, friable loam; and in the lower part, it is dark reddish brown, gravelly loam. The substratum, to a depth of about 60 inches, is yellowish brown, calcareous sand and gravel. In some places, the subsoil is deeper to sand and gravel than is typical. In a few areas, the surface layer is very dark gray sandy loam or loamy sand. In places, the substratum has more clay than is typical.

Permeability is moderate in the upper part of this soil and rapid in the lower part. Runoff in cultivated areas is slow. The surface layer varies widely in reaction because of local liming practices. The subsoil is slightly acid to neutral. The available water capacity is moderate. The organic matter content is moderate. The surface layer is friable and can be tilled easily within a wide range in moisture content. The root zone is restricted by calcareous sand and gravel below a depth of about 36 inches.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has good to fair potential for building site development and for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Using conservation tillage and returning crop residue to the soil help to reduce the loss of soil due to erosion.

This soil is moderately suited to building site development. Low strength and frost action are limitations in using this soil as sites for local roads and streets and for buildings. These limitations can be overcome by replacing the base material. This soil is well suited to use as

septic tank absorption fields, but the effluent can contaminate ground water because of seepage. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water. This soil is well suited to use as a source of sand, gravel, and topsoil.

Capability subclass IIe.

290C2—Warsaw loam, 5 to 9 percent slopes, eroded. This is a sloping, well drained soil on terrace breaks and prominent kames on till plains. Areas are linear or oval in shape and range from 2 to 100 acres in size.

Typically, the surface layer is very dark gray and very dark brown loam about 8 inches thick. The subsoil is about 18 inches thick. In the upper part, it is brown, friable loam, and in the lower part, it is dark reddish brown, gravelly loam. The substratum, to a depth of about 60 inches, is yellowish brown, calcareous sand and gravel. In some places, the subsoil is deeper to calcareous sand and gravel than is typical.

Included in mapping are small, scattered areas of excessively drained Rodman soils. These soils are in positions on the landscape similar to those of this Warsaw soil. They make up 2 to 4 percent of this map unit.

Permeability is moderate in the upper part of this soil and rapid in the lower part. Runoff in cultivated areas is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is slightly acid to neutral. The available water capacity is moderate. The organic matter content is moderate. The surface layer is friable and can be tilled easily within a wide range in moisture content. The root zone is restricted by calcareous sand and gravel below a depth of about 25 inches.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. This soil has good potential for use as habitat for openland wildlife. It has fair to good potential for building site development and for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Contour farming, conservation tillage, and returning crop residue to the soil help to reduce the loss of soil due to erosion.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil is well suited to use as habitat for openland wildlife. Grasses, herbs, shrubs, and vines provide food, shelter, and nesting sites for openland wildlife. The potential for establishing habitat elements, including grain and seed crops, domestic grasses and legumes, and wild herbaceous plants, is good.

This soil is moderately suited to building site development. Low strength and frost action are limitations in using this soil as a site for local roads and streets and for buildings. These limitations can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields, but the effluent can contaminate ground water because of seepage. It is not suitable for sewage lagoons because of seepiness and the steepness of slopes. This soil is well suited to use as a source of sand, gravel, and topsoil.

Capability subclass IIIe.

293—Andres silt loam. This is a nearly level, somewhat poorly drained soil on upland divides and on uneven foot slopes. Areas are irregular in shape and range from 2 to 200 acres in size.

Typically, the upper part of the surface layer is black silt loam about 9 inches thick, and the lower part is very dark gray silty clay loam about 8 inches thick. The subsoil is about 33 inches thick. In the upper part, it is grayish brown silty clay loam; in the middle part, it is mixed grayish brown and yellowish brown clay loam; and in the lower part, it is mixed light brownish gray and yellowish brown silty clay loam. The substratum, to a depth of 60 inches, is mixed light brownish gray and yellowish brown, calcareous silty clay loam. In some places, the subsoil is thinner than is typical, and it is shallower to calcareous material. In areas where this soil is on uneven foot slopes, the surface layer is less than 10 inches thick. In a few areas, the substratum formed in glacial outwash material.

Included in mapping are small areas of moderately well drained Varna soils and poorly drained Selma soils. Varna soils are on conical mounds, and Selma soils are in drainageways. These soils make up 2 to 10 percent of this map unit.

Permeability is moderate in the subsoil and moderately slow in the substratum. Runoff in cultivated areas is slow to medium. The surface layer varies in reaction because of local liming practices. The subsoil is slightly acid to mildly alkaline. The available water capacity is high. The organic matter content is high. The shrink-swell potential of the subsoil is moderate. The surface layer is friable, and it is easy to till. However, the surface tends to crust, or the soil puddles after a hard rain. The root zone is restricted by compact silty clay loam glacial till below a depth of about 50 inches.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, vegetable crops, and grasses and legumes. Using conservation tillage and returning crop residue to the soil help to reduce the loss of soil due to erosion. Returning crop residue or adding other organic material to the soil

helps to improve fertility, reduce crusting, and increase water infiltration.

This soil is suitable for use as pastureland or hayland. However, overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Plantings for pasture and hay, proper stocking rates, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition.

The seasonal water table limits the use of this soil as a site for dwellings with or without a basement. A drainage system needs to be installed to help overcome this limitation. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. A septic tank absorption field will not function properly on this soil unless the seasonal water table is lowered or the absorption field is placed in a seepage bed above the water table. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to compensate for the slow movement of effluent. This soil is not suitable for use as sewage lagoons because of the seasonal high water table.

Capability class I.

297B—Ringwood silt loam, 2 to 5 percent slopes. This is a gently sloping, well drained soil on ridges and side slopes on uplands. Areas are irregular in shape and range from 5 to 60 acres in size.

Typically, the upper part of the surface layer is very dark grayish brown silt loam about 8 inches thick, and the lower part is dark brown silt loam about 6 inches thick. The subsoil is about 23 inches thick. In the upper part, it is brown, friable silty clay loam; in the middle part, it is brown, friable clay loam; and in the lower part, it is brown and yellowish brown, friable sandy clay loam. The substratum is light yellowish brown, friable sandy loam. In some areas, the surface layer is not so thick as is typical. In places, this soil has more sand throughout. In some areas, the substratum of sandy loam till is closer to the surface. In places, a clay loam paleosol is in the lower part of this soil.

Included in mapping are small areas of somewhat poorly drained Elburn soils. Elburn soils are in drainageways and make up 2 to 5 percent of this map unit. Also included are areas of Hitt soils on ridgetops. The Hitt soils have bedrock within a depth of 60 inches. They make up 1 to 5 percent of this map unit.

Permeability is moderate in the subsoil and moderately rapid in the substratum. Runoff is medium. The surface layer and subsoil range from slightly acid to moderately alkaline. Free carbonates are in the substratum. Natural fertility and the organic matter content are high. The available water capacity is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. The root zone is restricted by the sandy loam till substratum at a depth between 30 and 40 inches.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has fair to good potential for building site development and for use as septic tank absorption fields. This soil has good potential for recreation uses.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce the loss of soil due to erosion. Returning crop residue or adding other organic material to the soil helps to improve fertility, reduce crusting, and increase water infiltration.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil is well suited to recreation uses such as camp areas, picnic areas, paths and trails, and golf fairways. Slope is a limitation to use as playgrounds.

This soil is moderately suited to building site development. Low strength is a limitation in using this soil as a site for local roads and streets and for buildings. This limitation can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields. The bottom of sewage lagoons needs to be sealed to prevent contamination of ground water.

Capability subclass IIe.

297C2—Ringwood silt loam, 5 to 9 percent slopes, eroded. This is a sloping, well drained soil on upland side slopes and on shoulder slopes along drainageways. Areas are irregular in shape and range from 5 to 150 acres in size.

Typically, the upper part of the surface layer is very dark grayish brown silt loam about 6 inches thick, and the lower part is dark brown silt loam about 5 inches thick. The subsoil is about 21 inches thick. In the upper part, it is brown, friable silty clay loam; in the middle part, it is brown, friable clay loam; and in the lower part, it is brown and dark yellowish brown, friable sandy clay loam. The substratum is light yellowish brown, friable sandy loam. In some areas, the surface layer is not so thick as is typical. In places, this soil has more sand throughout. In some areas, the substratum of sandy loam till is closer to the surface. In places, a clay loam paleosol is in the lower part of this soil.

Included in mapping are small areas of somewhat poorly drained Elburn soils and moderately deep Rockton and Dodgeville soils. Elburn soils are in drainageways and make up 2 to 5 percent of this map unit. Rockton and Dodgeville soils are on ridgetops and side

slopes and have bedrock within a depth of 40 inches. They make up 1 to 5 percent of this map unit.

Permeability is moderate in the subsoil and moderately rapid in the substratum. Runoff in cultivated areas is medium. The surface layer and subsoil range from slightly acid to moderately alkaline. Free carbonates are in the substratum. Natural fertility and the organic matter content are high. The available water capacity is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. The root zone is restricted by the sandy loam till substratum at a depth between 30 and 40 inches.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has fair to good potential for building site development and for use as septic tank absorption fields. This soil has good potential for most recreation uses.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce the loss of soil due to erosion.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil is well suited to recreation uses such as camp areas, picnic areas, paths and trails, and golf fairways. Slope is a limitation for playgrounds.

This soil is moderately suited to building site development. Low strength is a limitation in using this soil as a site for local roads and streets and for buildings. This limitation can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields. It is not suitable for sewage lagoons because of seepiness and the steepness of slopes.

Capability subclass IIe.

310B—McHenry silt loam, 2 to 5 percent slopes. This is a gently sloping, well drained soil on ridgetops and the upper part of side slopes on uplands. Areas are linear in shape and range from 3 to 20 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 10 inches thick. The subsoil is about 28 inches thick. In the upper part, it is dark yellowish brown, friable silt loam; in the middle part, it is dark brown and dark yellowish brown, firm loam and clay loam; and in the lower part, it is yellowish brown, friable loam. The substratum, to a depth of about 60 inches, is light yellowish brown, very friable, calcareous sandy loam. In some places, the subsoil is a reddish clay loam paleosol, and the substratum is at a greater depth. In some areas, the upper part of this soil has more sand than is typical.

Included in mapping are small areas of somewhat poorly drained Stronghurst and Kendall soils in shallow depressions and drainageways. These soils make up 2 to 5 percent of this map unit.

Permeability is moderate in the subsoil and moderately rapid in the substratum. Runoff in cultivated areas is medium. In the upper part, this soil is strongly acid to neutral, and in the lower part of the subsoil, it is slightly acid to mildly alkaline. The substratum is calcareous. The available water capacity is moderate. The organic matter content is moderately low. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. The shrink-swell potential is moderate in the subsoil and low in the substratum. The root zone is restricted by the calcareous sandy loam till below a depth of 40 inches.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay, pasture, and trees. It has fair to good potential for building site development and for use as septic tank absorption fields. This soil has good potential for recreation uses.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to improve fertility, to reduce crusting, and to increase water infiltration.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IIe.

310C2—McHenry silt loam, 5 to 9 percent slopes, eroded. This is a sloping, well drained soil on side slopes along upland drainageways. Areas are irregular in shape and range from 5 to 80 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 10 inches thick. The subsoil is about 26 inches thick. In the upper part, it is dark yellowish brown, friable silt loam; in the middle part, it is dark brown and dark yellowish brown, firm loam and clay loam; and in

the lower part, it is yellowish brown, friable loam. The substratum, to a depth of about 60 inches, is light yellowish brown, very friable, calcareous sandy loam. In some places, the surface layer is not so thick as is typical. In places, the subsoil is a reddish clay loam paleosol, and the substratum is at a greater depth. In some areas, this soil has more sand in the upper part. In areas where this soil is eroded, the sandy loam till substratum is closer to the surface.

Included in mapping are small areas of somewhat poorly drained Stronghurst and Kendall soils in drainageways. These soils make up 2 to 5 percent of this map unit.

Permeability is moderate in the subsoil and moderately rapid in the substratum. Runoff in cultivated areas is medium. In the upper part, this soil is strongly acid to neutral, and in the lower part of the subsoil, it is slightly acid to mildly alkaline. The substratum is calcareous. The available water capacity is moderate. The organic matter content is moderately low. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. The shrink-swell potential is moderate in the subsoil and low in the substratum. The root zone is restricted by the calcareous sandy loam till below a depth of 40 inches.

In most areas, this soil is used for farming. It has fair potential for cultivated crops and for hay, pasture, and trees. It has fair to good potential for building site development and for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of conservation tillage, and returning crop residue to the soil help to reduce the loss of soil due to erosion. Returning crop residue or adding other organic material to the soil helps to improve fertility, to reduce crusting, and to increase water infiltration.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields. It is not suitable for use as sewage lagoons because of seepiness and the steepness of slopes.

Capability subclass IIIe.

327B—Fox loam, 1 to 5 percent slopes. This is a gently sloping, well drained soil on narrow terraces adjacent to stream channels and on side slopes of kames. Areas are linear in shape and range from 2 to 100 acres in size.

Typically, the surface layer is dark grayish brown loam about 10 inches thick. The subsoil is about 22 inches thick. In the upper part, it is dark yellowish brown to brown clay loam; and in the lower part, it is brown to dark brown, gravelly loam and gravelly sandy loam. The substratum, to a depth of 60 inches, is dark yellowish brown, strongly alkaline, loose sand and gravel. In some places, this soil is deeper to gravel than is typical, and in other places, there is no gravel. In a few places, the surface layer is darker than is typical.

Permeability is moderate in the upper part of this soil and rapid in the underlying material. Runoff in cultivated areas is slow to medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is medium acid to neutral. The available water capacity is moderate. The organic matter content is moderately low. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. However, the surface tends to crust, or the soil puddles after a hard rain. The root zone is restricted by calcareous gravel below a depth of about 24 inches.

In most areas, this soil is used for farming. It has fair potential for cultivated crops and for small grains, hay, and pasture. It has fair to good potential for building site development and for use as septic tank absorption fields.

This soil has fair potential for corn, soybeans, small grains, and grasses and legumes. Contour farming, the use of conservation tillage, and returning crop residue to the soil help to reduce the loss of soil due to erosion.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields, but the effluent can pollute ground water because of seepage. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IIe.

327C2—Fox loam, 5 to 9 percent slopes, eroded. This is a sloping, well drained soil on breaks of high terraces adjacent to stream channels and on side slopes of kames. Areas are linear or irregular in shape and range from 2 to 80 acres in size.

Typically, the surface layer is dark grayish brown loam about 8 inches thick. The subsoil is about 20 inches thick. In the upper part, it is dark yellowish brown clay loam, and in the lower part, it is brown to dark brown, gravelly loam and gravelly sandy loam. The substratum, to a depth of 60 inches, is dark yellowish brown, moderately alkaline, loose sand and gravel. In some places, the gravel is at a shallower depth. In a few areas, the surface layer is thinner than is typical. In some places, gravel is exposed at the surface.

Permeability is moderate in the upper part of the soil and rapid in the underlying material. Runoff in cultivated areas is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is medium acid to neutral. The available water capacity is moderate. The organic matter content is moderately low. The shrink-swell potential of the subsoil is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. However, the surface tends to crust, or the soil puddles after a hard rain. The root zone is restricted by calcareous gravel below a depth of about 24 inches.

In most areas, this soil is used for farming. It has fair potential for cultivated crops and for small grains, hay, and pasture. It has good potential for use as woodland. It has fair to good potential for building site development, for use as septic tank absorption fields, and for recreation uses.

This soil has fair potential for corn, soybeans, small grains, and grasses and legumes. Contour farming, the use of conservation tillage, and returning crop residue to the soil help to reduce the loss of soil due to erosion.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil is well suited to use as woodland. In a few small areas, it is in native hardwoods. Tree seedlings of adapted species survive and grow well if competing vegetation is controlled or removed. There are few hazards or limitations to planting or harvesting trees.

This soil has good potential for most recreation uses. It has poor potential for playgrounds because of the excessive slope.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields, but the effluent can contaminate ground water because of seepage. This soil is not suitable for use as sewage lagoons because of seepiness and the steepness of slopes.

Capability subclass IIIe.

329—Will loam. This is a nearly level or depressional, poorly drained soil on low terraces adjacent to major streams. Areas are linear in shape and range from 2 to 200 acres in size. This soil is subject to occasional flooding for brief periods in spring.

Typically, the surface layer is black loam about 14 inches thick. The subsoil is about 14 inches thick. In the upper part, it is grayish brown loam and sandy clay loam, and in the lower part, it is mixed black and dark grayish brown sandy loam. The substratum, to a depth of 36 inches, is brown to dark grayish brown, gravelly sand and gravelly sandy loam; below that, to a depth of 60 inches, it is mixed brown and light brownish gray sand and gravel. In some places, the substratum is deeper to gravel. In a few places, the surface layer is thicker than is typical.

Included in mapping are small areas of Selma and Comfrey soils that are in positions on the landscape similar to those of this Will soil. Unlike this Will soil, Selma and Comfrey soils do not have gravel in the substratum. They have moderate over moderately rapid permeability. Selma and Comfrey soils make up 5 to 10 percent of this map unit.

Permeability is moderate in the subsoil and rapid in the substratum. Runoff in cultivated areas is very slow. The surface layer varies widely in reaction because of local liming practices. The subsoil is slightly acid to mildly alkaline. The available water capacity is moderate. The organic matter content is high. The shrink-swell potential is moderate in the subsoil. The root zone is restricted by calcareous, coarse gravel below a depth of about 2 feet.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. It needs to be adequately drained for good crop production. If suitable outlets are available, tile drainage is effective; however, the underlying sand and gravel tend to cave in when trenches are dug. Using tile collars helps to keep tile from filling up with sand after construction. If this soil is worked when wet, the surface compacts, and the soil structure deteriorates.

This soil is suitable for use as pastureland and hayland. However, overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Plantings for pasture and hay, proper stocking rates, pasture rota-

tion, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition.

The seasonal water table limits the use of this soil as a site for dwellings with or without a basement. A drainage system needs to be installed to help overcome this limitation. This soil also needs to be protected from flooding. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. The seasonal water table also is a limitation for local roads and streets. This soil is not suitable as sites for sanitary facilities because of the seasonal high water table and the hazard of flooding. Also, the effluent can contaminate ground water because of seepage.

Capability subclass IIw.

332A—Billett sandy loam, 0 to 2 percent slopes. This is a nearly level, well drained soil on drainage divides on uplands and on broad terraces. Areas are irregular in shape and range from 2 to about 40 acres in size.

Typically, the surface layer is very dark grayish brown, friable sandy loam about 8 inches thick. The subsurface layer is brown, friable sandy loam about 5 inches thick. The subsoil is about 34 inches thick. In the upper part, it is dark yellowish brown, friable sandy loam, and in the lower part, it is yellowish brown, brown, and dark yellowish brown loamy sand and sandy loam. The substratum is dark yellowish brown loamy sand that has some gravel. In some places, the surface layer is lighter colored than is typical, and in other places it is more than 10 inches thick. In places, silty material is in the lower part of the subsoil.

Included in mapping are small areas of somewhat poorly drained La Hogue and Hoopeston soils and poorly drained Drummer soils. These soils are in shallow depressions and drainageways and make up 2 to 5 percent of this map unit.

Permeability is moderately rapid in the subsoil and rapid in the substratum. Runoff in cultivated areas is slow. The available water capacity is moderate. The organic matter content is moderately low. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to medium acid. The surface layer is friable and is easy to work; however, it is subject to soil blowing when dry.

In most areas, this soil is used for farming. It has fair to poor potential for cultivated crops and for hay and pasture. It has good potential for building site development and for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. The use of field windbreaks and conservation tillage and returning crop residue to the soil help to reduce erosion. Planting crops early in spring helps to reduce the effect of droughtiness in summer.

This soil is suited to use as sites for dwellings with or without a basement. Frost action is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields; however, shallow underground aquifers can become polluted because the underlying material is rapidly permeable. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IIIs.

332B—Billett sandy loam, 2 to 6 percent slopes. This is a gently sloping, well drained soil on upland drainage divides and on terraces. Areas are irregular in shape and range from 2 to about 60 acres in size.

Typically, the surface layer is very dark grayish brown, friable sandy loam about 8 inches thick. The subsoil is about 30 inches thick. In the upper part, it is dark yellowish brown, friable sandy loam, and in the lower part, it is yellowish brown, brown, and dark yellowish brown loamy sand and sandy loam. The substratum is dark yellowish brown loamy sand. In some places, the surface layer is lighter colored than is typical. In places, gravel is in the lower part of the subsoil and in the substratum. In other places, silty material is in the lower part of the subsoil. In some areas, subsoil material has been mixed into the surface layer by plowing.

Included in mapping are small areas of somewhat poorly drained Hoopeston soils and poorly drained Drummer and Selma soils. These soils are in drainageways and make up about 2 to 5 percent of this map unit.

Permeability is moderately rapid in the subsoil and rapid in the substratum. Runoff in cultivated areas is medium. The available water capacity is moderate. The organic matter content is moderately low. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to medium acid. The surface layer is friable and is easy to work; however, it is subject to soil blowing when dry.

In most areas, this soil is used for farming. It has fair to poor potential for cultivated crops and for hay and pasture. It has good potential for building site development and for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Soil blowing and water erosion are hazards. The use of field windbreaks and conservation tillage and returning crop residue to the soil help to reduce erosion. Heavy applications of fertilizer generally are not economical because crop growth is limited by the moderate available water capacity of this soil. Planting crops early in spring helps to reduce the effect of droughtiness in summer.

This soil is suited to use as sites for dwellings with or without a basement. The hazard of frost action is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields; however, shallow ground-water aquifers can become polluted because the underlying material is rapidly permeable. The bottom of sewage

lagoons needs to be sealed to prevent contamination of ground water.

Capability subclass IIIe.

343—Kane silt loam. This is a nearly level, somewhat poorly drained soil in depressions on low terraces and outwash plains. Areas are irregular in shape and range from 5 to 65 acres in size.

Typically, the surface layer is black and very dark gray, heavy silt loam about 13 inches thick. The subsoil is about 18 inches thick. In the upper part, it is dark grayish brown, mottled silty clay loam, and in the lower part, it is dark grayish brown and grayish brown, mottled clay loam. The substratum, to a depth of 60 inches, is yellowish brown, calcareous sand and gravel. In some places, the upper part of this soil has more sand than is typical. In some places, sand and gravel are closer to the surface.

Included in mapping are small areas of well drained Warsaw soils in higher positions on the landscape and areas of poorly drained Will soils in depressions and drainageways. These soils make up 2 to 10 percent of this map unit.

Permeability is moderate in the upper part of this soil and rapid in the lower part. Runoff in cultivated areas is slow. The surface layer and the subsoil are medium acid to mildly alkaline. The available water capacity is moderate. Natural fertility and the organic matter content are high. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. The seasonal water table is within a depth of 1 to 3 feet.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, and grasses and legumes. Using conservation tillage and returning crop residue to the soil help to reduce the loss of soil due to erosion. Returning crop residue or adding other organic material to the soil helps to maintain fertility and tilth.

This soil is suitable for use as pastureland or hayland. However, overgrazing or grazing when the soil is too wet reduces production of forage and causes surface compaction, excessive runoff, and poor tilth. Plantings for pasture and hay, proper stocking rates, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition.

The seasonal water table limits the use of this soil as a site for dwellings with or without a basement. A drainage system needs to be installed to help overcome this limitation. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. A septic tank absorption field will not function properly on this soil unless the seasonal water table is lowered or the absorption field is placed in a seepage bed above the water table. There is a hazard of ground water contamination because of seepage. This soil is not suitable for use as sewage lagoons because of seepiness and the seasonal high water table.

Capability subclass IIe.

354A—Hononegah loamy coarse sand, 0 to 3 percent slopes. This is a nearly level, excessively drained soil on broad terraces along major streams. Areas are irregular or linear in shape and range from 2 to 160 acres in size.

Typically, the upper part of the surface layer is very dark brown loamy coarse sand about 8 inches thick, and the lower part is very dark brown and dark brown loamy coarse sand about 11 inches thick. The subsoil is about 12 inches thick. In the upper part, it is dark yellowish brown loamy coarse sand, and in the lower part, it is dark yellowish brown, very gravelly loamy coarse sand. The substratum, to a depth of about 60 inches, is yellowish brown, calcareous, very gravelly loamy coarse sand. In some places, the surface layer and subsoil are loamy. In places, there is no gravel in this soil.

Included in mapping are small areas of well drained Warsaw and Wea soils in positions on the landscape similar to those of this Hononegah soil. Warsaw and Wea soils have a finer textured surface layer and subsoil and are less droughty than this Hononegah soil. These soils make up 10 to 15 percent of this map unit.

Permeability is very rapid, and runoff in cultivated areas is slow. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to medium acid. The available water capacity is low. The organic matter content is moderately low. This soil can be tilled easily within a wide range in moisture content; however, the surface dries rapidly and is very susceptible to soil blowing. Droughtiness and low natural fertility limit the use of this soil for farming.

In most areas, this soil is used for farming. Some areas are used for the production of Christmas trees. This soil has fair to good potential for hay and pasture plants. It has good potential for building site development and for use as septic tank absorption fields.

This soil is poorly suited to corn and soybeans because it is too droughty. Maintaining fertility is difficult because plant nutrients are rapidly leached below the root zone. Severe soil blowing is a hazard if conventional tillage methods are used. Using conservation tillage and returning crop residue to the soil help to reduce soil blowing.

Using this soil for Christmas tree production helps to control soil blowing and to conserve soil moisture. Seedling mortality is high due to droughtiness; however, it can be reduced if competing vegetation is controlled or removed.

Using this soil as hayland and pastureland is effective in controlling soil blowing. However, overgrazing results in poor vegetative growth and increases plant mortality. Plantings for pasture and hay, proper stocking rates,

pasture rotation, fertilization, weed control, and timely deferment of grazing help to keep pasture in good condition.

If the native plant cover is maintained, this soil has fair to good potential for the development of habitat for openland wildlife. Droughtiness and low fertility are limitations to the development of a grass-legume cover or a wildlife food plot. If adapted species of pine are planted, this soil can provide suitable cover for openland and woodland wildlife.

This soil is well suited to use as sites for dwellings or small commercial buildings. It has sufficient strength and stability to support vehicular traffic. This soil is well suited to use as septic tank absorption fields; however, in places, ground water can become polluted because of the sand substratum. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IVs.

354B—Hononegah loamy coarse sand, 3 to 7 percent slopes. This is a gently sloping, excessively drained soil in elevated areas on stream terraces and on terrace escarpments. Areas are linear in shape and range from 5 to 100 acres in size.

Typically, the upper part of the surface layer is very dark brown loamy coarse sand about 7 inches thick, and the lower part is dark brown loamy coarse sand about 8 inches thick. The subsoil is about 12 inches thick. In the upper part, it is dark yellowish brown loamy coarse sand, and in the lower part, it is dark yellowish brown, very gravelly loamy coarse sand. The substratum, to a depth of about 60 inches, is yellowish brown, calcareous, very gravelly loamy coarse sand. In some places, the surface layer and the subsoil are loamy. In other places, gravel is exposed at the surface. In some areas, slopes are more than 7 percent.

Included in mapping are small areas of well drained Warsaw soils in positions on the landscape similar to those of this Hononegah soil. Warsaw soils have a finer textured surface layer and subsoil and are less droughty than this Hononegah soil. These soils make up 10 to 15 percent of this map unit.

Permeability is very rapid, and runoff is slow. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to medium acid. Available water capacity is low. The organic matter content is moderately low. This soil can be tilled easily within a wide range in moisture content; however, the surface dries rapidly and is very susceptible to soil blowing. Droughtiness and low natural fertility limit the use of this soil for farming.

In most areas, this soil is used for farming; however, it has poor potential for cultivated crops. It has good potential for the production of Christmas trees. It has fair to good potential for hay and pasture plants. It has good potential for building site development and for use as septic tank absorption fields.

This soil is poorly suited to corn and soybeans because of droughtiness. Maintaining fertility is difficult because plant nutrients are rapidly leached below the root zone. Severe soil blowing and water erosion are hazards if conventional tillage methods are used. The use of field windbreaks and conservation tillage and returning crop residue to the soil help to reduce the loss of soil due to erosion.

Using this soil for Christmas tree production helps to control soil blowing and to conserve soil moisture. Seedling mortality is high because of droughtiness, but it can be reduced if competing vegetation is controlled or removed.

If the native plant cover is maintained, this soil has fair to good potential for the development of habitat for openland wildlife. Droughtiness and low fertility are limitations to the development of a grass-legume cover or a wildlife food plot. If adapted species of pine are planted, this soil can provide suitable cover for openland and woodland wildlife.

Using this soil as hayland and pastureland helps to control soil blowing. Overgrazing causes poor vegetative growth and increases plant mortality. Plantings for pasture and hay, proper stocking rates, pasture rotation, fertilization, weed control, and the timely deferment of grazing help to keep the pasture in good condition and help to reduce the loss of soil due to erosion.

This soil is well suited to use as sites for dwellings or small commercial buildings. It has sufficient strength and stability to support vehicular traffic. It is well suited to use as septic tank absorption fields; but, in some places, ground water can become polluted because the substratum is sandy. The bottom of sewage lagoons needs to be sealed to prevent contamination of ground water.

Capability subclass VIs.

361B—Kidder loam, 2 to 5 percent slopes. This is a deep, gently sloping, well drained soil on side slopes and low ridges and on knolls near stream valleys on upland till plains. Areas are linear or irregular in shape and range from 2 to 60 acres in size.

Typically, the surface layer is dark brown loam about 9 inches thick. The subsoil is about 20 inches thick. In the upper part, it is brown clay loam, and in the lower part, it is yellowish brown sandy loam. The substratum, to a depth of 60 inches, is light yellowish brown sandy loam. In some places, the subsoil is deeper to the calcareous sandy loam till than is typical. In a few areas, sandy layers are in the lower part of the substratum. In some areas, the surface layer has less sand.

Included in mapping are small areas of somewhat poorly drained La Hogue soil in small drainageways. These soils make up 2 to 5 percent of this map unit.

Permeability is moderate in the subsoil and moderately rapid in the substratum. Runoff in cultivated areas is

medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is medium acid and slightly calcareous. The available water capacity is moderate. The organic matter content is moderately low. The shrink-swell potential is moderate in the subsoil. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. However, the surface tends to crust, or the soil puddles after a hard rain. The root zone is restricted by compact sandy loam glacial till below a depth of about 36 inches.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for small grains, hay, and pasture. It has fair to good potential for building site development and for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce the loss of soil due to erosion. Returning crop residue or adding other organic material to the soil helps to maintain fertility, reduce crusting, increase water infiltration, and reduce soil loss.

This soil is suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IIe.

361C2—Kidder loam, 5 to 9 percent slopes, eroded. This is a deep, sloping, well drained soil on upland side slopes adjacent to small drainageways and stream valleys. Areas are irregular in shape and range from 2 to 60 acres in size.

Typically, the surface layer is brown or dark brown loam or clay about 8 inches thick. The subsoil is about 20 inches thick. In the upper part, it is brown clay loam, and in the lower part, it is yellowish brown sandy loam. The substratum, to a depth of 60 inches, is light yellowish brown sandy loam. In some places, the subsoil is deeper to lime than is typical. In a few areas, the substratum has sandy layers. Where this soil has been plowed, material from the subsoil has been mixed into the surface layer. In a few areas, the surface layer has less sand than is typical.

Permeability is moderate in the subsoil and moderately rapid in the substratum. Runoff is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is medium acid and slightly calcareous. The available water capacity is moderate. The organic matter content is moderately low. The shrink-swell potential in the subsoil is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. The surface tends to crust, or the soil puddles after a hard rain, particularly in areas where subsoil material has been mixed into the plow layer. The root zone is restricted by compact sandy loam glacial till below a depth of about 36 inches.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for small grains, hay, and pasture. It has fair to good potential for building site development and as sites for septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce the loss of soil due to erosion. Returning crop residue or adding other organic material to the soil helps to maintain fertility, reduce crusting, and increase water infiltration.

This soil is suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil is well suited to use as woodland. In a few small areas, it is in native hardwoods. Tree seedlings survive and grow well if competing vegetation is controlled or removed. There are few hazards or limitations to planting or harvesting trees.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields. It is not suitable for use as sewage lagoons because of seepiness and the steepness of slopes.

Capability subclass IIIe.

361D2—Kidder loam, 9 to 15 percent slopes, eroded. This is a deep, gently sloping, well drained soil on side slopes adjacent to small drainageways and stream valleys. Areas are irregular in shape and range from 2 to 100 acres in size.

Typically, the surface layer is dark brown loam about 7 inches thick. The subsoil is about 20 inches thick. In the upper part, it is brown clay loam, and in the lower part, it is yellowish brown sandy loam. The substratum, to a depth of 60 inches, is light yellowish brown sandy loam. In some places, the subsoil is deeper to calcareous sandy loam than is typical. In places, the surface layer and the upper part of the subsoil formed in silty material. In a few areas, sandy layers are in the lower part of the substratum. In cultivated areas, material from the subsoil has been mixed into the surface layer by plowing. In some small areas, gravel is exposed at the surface.

Permeability is moderate in the subsoil and moderately rapid in the substratum. Runoff is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is medium acid and slightly calcareous. The available water capacity is moderate. The organic matter content is moderately low. The shrink-swell potential is moderate in the subsoil. The root zone is restricted by compact sandy loam glacial till below a depth of about 36 inches.

In most areas, this soil is used as pastureland or hayland. It has good potential for grasses and legumes. It has good potential for the development of habitat for openland and woodland wildlife. This soil has fair potential for building site development and for use as septic tank absorption fields. It has fair potential for recreation uses.

This soil is suited to small grains, hay, and pasture. If this soil is used for cultivated crops, water erosion is a hazard. Intensive erosion-control practices are needed if cultivated crops are grown. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion.

This soil is suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil is well suited to use as habitat for openland or woodland wildlife. It has good potential for habitat elements, such as grasses and legumes and wild herbaceous upland plants. It has good potential for woodland-wildlife habitat elements such as coniferous woody plants and hardwoods. This soil provides sufficient food and cover for woodland wildlife.

This soil is well suited to use as woodland. In a few small areas, it is in native hardwoods. Tree seedlings survive and grow well if competing vegetation is controlled or removed. Erosion is a hazard when planting or harvesting trees.

This soil has fair potential for recreation uses. Slope is the major limitation for camp areas, picnic areas, playgrounds, and paths and trails. The slope limitation can be partially overcome by establishing playgrounds in areas of the less sloping soils in this unit.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. Septic tank absorption field lines need to be designed and placed on the contour to provide for an even distribution of effluent. This soil is not suitable for use as sewage lagoons because of seepiness and the steepness of slopes.

Capability subclass IVe.

361D3—Kidder clay loam, 9 to 15 percent slopes, severely eroded. This is a deep, gently sloping, well drained soil on side slopes adjacent to small drainageways and stream valleys. Areas are irregular in shape and range from 2 to 40 acres in size.

Typically, the original surface layer has been removed through erosion, and the subsoil is exposed at the surface. The present surface layer is brown clay loam about 7 inches thick. The subsoil is about 18 inches thick. In the upper part, it is brown clay loam, and in the lower part, it is yellowish brown sandy loam. The substratum, to a depth of 60 inches, is light yellowish brown sandy loam. In some places, the subsoil is shallower to calcareous sandy loam than is typical. In a few areas, sandy layers are in the lower part of the substratum.

Included in mapping are some small areas where gravel or limestone is on the surface.

Permeability is moderate in the subsoil and moderately rapid in the substratum. Runoff is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is medium acid and slightly calcareous. The available water capacity is moderate. The organic matter content is very low. The shrink-swell potential in the subsoil is moderate. The root zone is restricted by compact sandy loam glacial till below a depth of about 36 inches.

In most areas, this soil is used as pastureland or hayland. It has good potential for grasses and legumes. It has good potential for the development of habitat for openland and woodland wildlife. This soil has fair potential for building site development and for use as septic tank absorption fields. It has fair potential for recreation uses.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil is well suited to use as habitat for openland or woodland wildlife. It has good potential for habitat elements such as grasses and legumes and wild herbaceous upland plants. It also has good potential for habitat elements for woodland wildlife, such as coniferous woody plants and hardwoods. It can provide good food and cover for woodland wildlife.

This soil is well suited to use as woodland. In a few small areas, it is in native hardwoods. Tree seedlings survive and grow well if competing vegetation is controlled or removed. The hazard of erosion is a limitation to planting or harvesting trees.

This soil has fair potential for recreation uses. Slope is the major limitation for camp areas, picnic areas, playgrounds, and paths and trails. This limitation can be partially overcome by establishing playgrounds in areas of the less sloping soils in this unit.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. Septic tank absorption field lines need to be designed and placed on the contour to provide for an even distribution of effluent. This soil is not suitable for use as sewage lagoons because of seepiness and the steepness of slopes.

Capability subclass VIe.

363B—Griswold sandy loam, 2 to 5 percent slopes. This is a gently sloping, well drained soil on upland drainage divides and on convex ridgetops. Areas are linear in shape and range from 2 to 80 acres in size.

Typically, the upper part of the surface layer is very dark grayish brown sandy loam about 9 inches thick, and the lower part is dark brown sandy loam about 6 inches thick. The subsoil is about 21 inches thick. In the upper part, it is brown, friable sandy loam, and in the lower part, it is brown and dark yellowish brown, friable loam and sandy clay loam. The substratum, to a depth of 60 inches, is light yellowish brown, calcareous sandy loam. In some places, the subsoil is deeper to calcareous sandy loam than is typical. In some areas, the subsoil is reddish brown clay loam. In a few areas, it is brown or dark yellowish brown sandy loam and extends to a depth of more than 40 inches. In some areas, the surface layer has less sand than is typical.

Included in mapping are small areas of somewhat poorly drained La Hogue and Hoopeston soils and poorly drained Selma soils. These soils are in shallow depressions and drainageways and make up 2 to 5 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to medium acid. The available water capacity and the organic matter content are moderate. The surface layer is friable and can be tilled easily within a wide range in moisture content. The root zone is somewhat restricted by the alkaline sandy loam glacial till below a depth of about 36 inches.

In most areas, this soil is used for farming. It has fair potential for cultivated crops and good potential for hay and pasture. It has good to fair potential for recreation uses and good potential for building site development and for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Droughtiness is a limitation for cultivated crops. If this soil is used for cultivated crops, soil blowing is a hazard. The use of field windbreaks and conservation tillage and returning crop residue to the soil help to reduce soil blowing. Returning crop residue or adding other organic material to the soil helps to maintain fertility, to improve water infiltration, and to reduce soil blowing.

This soil is suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil is suitable for recreation uses. It has good potential for camp areas, picnic areas, and paths and trails. It has only fair potential for playgrounds because of slope. Playgrounds can be constructed on the nearly level Griswold soils on ridgetops.

This soil is suitable for building site development and for use as septic tank absorption fields. Frost action is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IIe.

363C2—Griswold sandy loam, 5 to 9 percent slopes, eroded. This is a sloping, well drained soil on narrow convex ridgetops and on the upper part of side slopes. Areas are irregular in shape and range from 5 to 200 acres in size.

Typically, the surface layer is very dark grayish brown sandy loam about 8 inches thick. The subsoil is about 18 inches thick. In the upper part, it is brown, friable sandy loam and loam, and in the lower part, it is yellowish brown, friable, gravelly sandy loam. The substratum, to a depth of 60 inches, is light yellowish brown, calcareous sandy loam. In some areas, the surface layer is less sandy than is typical. In some areas, the subsoil is reddish brown clay loam. In other areas, it is brown or dark yellowish brown sandy loam and extends to a depth of

more than 40 inches. In places, the subsoil is deeper to calcareous sandy loam than is typical. In a few areas, the substratum is yellowish brown or light yellowish brown, calcareous loam, loamy sand, or gravelly sand.

Included in mapping are small areas of somewhat poorly drained La Hogue and poorly drained Selma soils. These soils are in shallow depressions and drainageways and make up 2 to 5 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to medium acid. The available water capacity and the organic matter content are moderate. The surface layer is friable and can be tilled easily within a wide range in moisture content. The root zone is somewhat restricted by the alkaline sandy loam glacial till below a depth of about 30 inches.

In most areas, this soil is used for farming. It has fair potential for cultivated crops and for hay and pasture. It has good potential for the development of habitat for openland wildlife. This soil has good potential for building site development and for use as septic tank absorption fields.

This soil is suited to corn, small grains, and grasses and legumes. Droughtiness is a limitation for cultivated crops. If this soil is used for cultivated crops, soil blowing and water erosion are hazards. Contour farming; the use of terraces, field windbreaks, and conservation tillage; and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to maintain fertility.

This soil is suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil has good potential for the development of habitat for openland wildlife. Grasses, herbs, shrubs, and vines provide food, shelter, and nesting sites for openland wildlife. The potential for establishing habitat elements such as grain and seed crops, domestic grasses and legumes, and wild herbaceous plants is good.

This soil is suitable for building site development and for use as septic tank absorption fields. The hazard of frost action is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. This soil is not suitable for use as sewage lagoons because of the steepness of slopes. The surface layer has good potential for use as a source of topsoil.

Capability subclass IIIe.

363D2—Griswold sandy loam, 9 to 15 percent slopes, eroded. This is a strongly sloping, well drained soil on long convex upland side slopes adjacent to drainageways. Areas are irregular in shape and range from 5 to several hundred acres in size.

Typically, the surface layer is dark brown sandy loam about 7 inches thick. The subsoil is about 16 inches thick. In the upper part, it is brown, friable loam, and in the lower part, it is dark yellowish brown, gravelly sandy loam. The substratum, to a depth of 60 inches, is light yellowish brown, calcareous sandy loam. In places, the surface layer is less sandy than is typical. In some places, the subsoil is deeper to calcareous sandy loam than is typical. In some areas, the underlying material is yellowish brown or light yellowish brown, calcareous loam, loamy sand, or gravelly sand.

Included in mapping are small areas of somewhat poorly drained La Hogue soils and poorly drained Selma soils. These soils are in shallow depressions and drainageways and make up 1 to 3 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is rapid. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to medium acid. The available water capacity and the organic matter content are moderate. The root zone is somewhat restricted by the alkaline sandy loam glacial till below a depth of about 28 inches.

In most areas, this soil is used as hayland or pastureland. It has poor potential for cultivated crops and fair to good potential for hay and pasture. It has good potential for the development of habitat for openland wildlife. This soil has fair to poor potential for recreation uses, building site development, and for use as septic tank absorption fields.

This soil is suited to grasses and legumes for hay and pasture. It is not suited to cultivated row crops because of droughtiness and the hazards of soil blowing and water erosion.

This soil is suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

If a native plant cover is maintained, this soil has fair to good potential for use as habitat for openland wildlife. Droughtiness and low fertility are limitations to developing a grass-legume cover or a wildlife food plot. If adapted species of pine are planted, this soil can provide suitable cover for openland and woodland wildlife.

This soil has fair to poor potential for recreation uses. Slope is a limitation for camp areas, picnic areas, playgrounds, and paths and trails. If this soil is developed for recreation uses, the recreation facilities should be established on the small ridgetops and benches, where slopes are less steep.

This soil is suitable for building site development if slopes are smoothed or if the building is designed to overcome the slope limitation. The hazard of frost action

is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. Slope also is a limitation for local roads and streets. Septic tank absorption field lines need to be designed and placed on the contour to provide for an even distribution of effluent. This soil is not suitable for use as sewage lagoons because of the steepness of slopes.

Capability subclass VIe.

369—Waupecan silt loam. This is a nearly level, well drained soil on broad stream terraces in valleys of the major rivers. Areas are linear in shape and range from 5 to 1,500 acres in size.

Typically, the upper part of the surface layer is very dark gray silt loam about 9 inches thick, and the lower part is very dark grayish brown silt loam about 6 inches thick. The subsoil is about 36 inches thick. In the upper part, it is brown silt loam; in the middle part, it is brown silty clay loam; and in the lower part, it is brown loam. The substratum, to a depth of 60 inches, is gravelly coarse sand. In the area east of the Piscasaw River, on both sides of Angling Road, the surface layer generally is less than 10 inches thick. In some places, there is no gravel in the substratum. In other places, the upper part of the subsoil has more sand than is typical.

Included in mapping are small areas of Troxel soils in shallow depressions. These soils are subject to ponding. They make up 2 to 5 percent of this map unit.

Permeability is moderate in the subsoil and rapid in the substratum. Runoff in cultivated areas is slow. The surface layer varies widely in reaction because of local liming practices. The subsoil is slightly acid to strongly acid. The available water capacity is high. The organic matter content is moderate. The shrink-swell potential is moderate in the subsoil. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. However, the surface tends to crust, or the soil puddles after a hard rain.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has fair to good potential for building site development and for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Using conservation tillage and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to maintain fertility and reduce crusting.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields, but the effluent can contaminate ground water because of seepage. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability class I.

379A—Dakota silt loam, 0 to 3 percent slopes. This is a nearly level, well drained soil on broad terraces in valleys of the major rivers. Areas are linear in shape and range from 5 to 1,500 acres in size.

Typically, the surface layer is black silt loam about 13 inches thick. The subsoil is about 39 inches thick. In the upper part, it is dark brown silt loam or silty clay loam; in the middle part, it is dark brown clay loam; and in the lower part, it is dark yellowish brown sand. The substratum, to a depth of 60 inches, is pale brown, mildly alkaline, gravelly coarse sand. In some places, gravel is at a shallower depth.

Included in mapping are small areas of Troxel soils that are in shallow depressions where temporary ponding is a hazard. These soils make up 2 to 5 percent of this map unit.

Permeability is moderate in the upper part of the subsoil and rapid in the lower part. Runoff in cultivated areas is slow. The surface layer varies widely in reaction because of local liming practices. The subsoil is medium acid to neutral. The available water capacity and the organic matter content are moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. However, the surface tends to crust, or the soil puddles after a hard rain.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has good potential for building site development and for septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. It is slightly droughty during long periods of dry weather. Using conservation tillage and returning crop residue to the soil help to reduce erosion.

This soil is suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil is suitable for building site development. Low strength is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. Onsite septic tank absorption fields work well, but ground-water pollution is a hazard because the substratum has rapid permeability. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IIs.

386A—Downs silt loam, 0 to 2 percent slopes. This is a nearly level, well drained soil on ridges and broad

divides on uplands. Areas are irregular in shape and range from 10 to 150 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 8 inches thick. The subsoil is about 40 inches thick. In the upper part, it is brown, friable silty clay loam, and in the lower part, it is dark yellowish brown, friable silt loam. The substratum, to a depth of 60 inches, is yellowish brown silt loam. In some places, the surface layer is thicker than is typical. In a few areas, outwash material or a clay loam paleosol is within a depth of 60 inches.

Included in mapping are areas of somewhat poorly drained Atterberry and Muscatine soils. These soils are in shallow depressions and drainageways and make up 2 to 10 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is medium. The available water capacity is high. Natural fertility is high, and the organic matter content is moderate. The shrink-swell potential is moderate to high. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. The subsoil is strongly acid to mildly alkaline.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has fair to good potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Using conservation tillage and returning crop residue to the soil help to reduce the loss of soil due to erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability class I.

386B—Downs silt loam, 2 to 6 percent slopes. This is a gently sloping, well drained soil on upland divides and side slopes. Areas are irregular in shape and range from 10 to 200 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 7 inches thick. The subsoil is about 42 inches thick. In the upper part, it is brown and dark yellowish brown, friable silty clay loam, and in the lower part, it is dark brown, friable silt loam. The substratum is yellowish brown silt loam to a depth of 60 inches. In some places, the surface layer is thicker than is typical, and in other places, it is thinner. In some areas, outwash material or a clay loam paleosol is within a depth of 60 inches.

Included in mapping are areas of somewhat poorly drained Atterberry and Muscatine soils. These soils are in shallow depressions and drainageways and make up 2 to 5 percent of this map unit.

Permeability is moderate, and runoff is medium. The subsoil is very strongly acid to mildly alkaline. The available water capacity is high. Natural fertility is high, and the organic matter content is moderate. The surface layer is friable, and a seedbed can be easily prepared.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has fair to good potential for building site development and for use as sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IIe.

387A—Ockley silt loam, 0 to 2 percent slopes. This is a nearly level, well drained soil on broad terraces in valleys of the major rivers. Areas are linear in shape and range from 2 to 300 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 9 inches thick. The subsoil is about 45 inches thick. In the upper part, it is brown silt loam and silty clay loam; in the middle part, it is brown and yellowish brown clay loam and sandy clay loam; and in the lower part, it is brown sandy loam. The substratum, to a depth of 60 inches, is light yellowish brown, mildly alkaline gravelly sand. In some places, the subsoil is more silty in the upper part than is typical. In places, the gravelly sand is at a depth of less than 40 inches.

Permeability is moderate in the subsoil and very rapid in the substratum. Runoff in cultivated areas is slow. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to strongly acid. The available water capacity is high. The organic matter content is moderately low. The shrink-swell potential is moderate in the subsoil. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. However, the surface tends to crust, or the soil puddles after a hard rain.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for small grains, hay, and pasture. It has fair to good potential for building site development and for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Using conservation tillage and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to maintain fertility, to reduce crusting, and to increase water infiltration.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields. However, there is a hazard of ground-water pollution because the substratum has very rapid permeability. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability class I.

387B—Ockley silt loam, 2 to 5 percent slopes. This is a gently sloping, well drained soil on broad, high terraces in valleys of the major rivers. Areas are linear in shape and range from 2 to 100 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsoil is about 40 inches thick. In the upper part, it is dark yellowish brown silty clay loam, and in the lower part, it is brown and yellowish brown clay loam and sandy clay loam. The substratum, to a depth of 60 inches, is light yellowish brown, mildly alkaline sand and gravel. In some places, the subsoil is more silty in the upper part than is typical. In places, gravel is at a depth of less than 40 inches.

Permeability is moderate in the subsoil and very rapid in the substratum. Runoff in cultivated areas is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to strongly acid. The available water capacity is high. The organic matter content is moderately low. The shrink-swell potential in the subsoil is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. However, the surface tends to crust, or the soil puddles after a hard rain.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has fair to good potential for building site development and for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce the loss of soil due to erosion. Returning crop residue or adding other organic material to the soil helps to maintain fertility, to reduce crusting, and to increase water infiltration.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields, but ground-water pollution is a hazard because the substratum has very rapid permeability. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IIe.

398A—Wea silt loam, 0 to 2 percent slopes. This is a nearly level, well drained soil on broad, high terraces in valleys of the major rivers. Areas are linear in shape and range from 2 to 1,000 acres in size.

Typically, the upper part of the surface layer is very dark brown silt loam about 8 inches thick, and the lower part is very dark grayish brown silt loam about 7 inches thick. The subsoil is about 43 inches thick. In the upper part, it is brown clay loam; in the middle part, it is brown sandy loam; and in the lower part, it is mixed brown and dark brown, gravelly sandy clay loam. The substratum, to a depth of 60 inches, is mixed brown and yellowish brown, calcareous sand and gravel. In a few small areas, the surface layer is light colored and has moderately low organic matter content. In places, the surface layer is loam. In some places, the subsoil has more silt in the upper part than is typical. In some places, gravel is at a depth of more than 60 inches, and in other places, it is at a depth of less than 40 inches.

Included in mapping are small areas of Troxel soils in shallow depressions. These soils are subject to temporary ponding. They make up 2 to 5 percent of this map unit.

Permeability is moderate in the subsoil and very rapid in the substratum. Runoff is slow in cultivated areas. The surface layer varies widely in reaction because of local liming practices. The subsoil ranges from strongly acid in the upper part to neutral in the lower part. The available water capacity is high. The organic matter content is moderate. The shrink-swell potential in the subsoil is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. However, the surface tends to crust or the soil puddles after a hard rain.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has fair to good potential for building site development and for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Returning crop residue or adding

other organic material to the soil helps to maintain fertility and to reduce crusting. Using conservation tillage and leaving the crop residue on the surface or partially incorporating it into the surface layer help to control soil blowing.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields, but ground-water pollution is a hazard because the substratum has rapid permeability. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability class I.

398B—Wea silt loam, 2 to 5 percent slopes. This is a gently sloping, well drained soil on broad, high terraces in valleys of the major rivers. Areas are linear in shape and range from 2 to 100 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 12 inches thick. The subsoil is about 40 inches thick. In the upper part, it is brown clay loam; in the middle part, it is brown sandy clay loam; and in the lower part, it is mixed brown and dark brown, gravelly sandy clay loam. The substratum, to a depth of 60 inches, is mixed brown and yellowish brown, moderately alkaline sand and gravel. In a few small areas, the surface layer is light colored and has moderately low organic matter content. In places, the subsoil has more silt in the upper part than is typical. In some places, gravel is at a depth of more than 60 inches, and in other places, it is at a depth of less than 40 inches.

Permeability is moderate in the subsoil and very rapid in the substratum. Runoff is medium in cultivated areas. The surface layer varies widely in reaction because of local liming practices. The subsoil ranges from strongly acid in the upper part to neutral in the lower part. The available water capacity is high. The organic matter content is moderate. The shrink-swell potential of the subsoil is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. However, the surface tends to crust or the soil puddles after a hard rain.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has fair to good potential for building site development and for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields, but ground-water pollution is a hazard because the underlying material has rapid permeability. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IIe.

411B—Ashdale silt loam, 2 to 5 percent slopes. This is a gently sloping, well drained soil on convex ridgetops and knolls. Areas are irregular in shape and range from 5 to 160 acres in size.

Typically, the upper part of the surface layer is very dark brown silt loam about 9 inches thick, and the lower part is dark brown silt loam about 5 inches thick. The subsoil is about 31 inches thick. In the upper part, it is brown and yellowish brown, friable silty clay loam; and in the lower part, it is reddish brown and dark brown, firm silty clay. Brownish yellow dolomitic limestone is at a depth of 45 inches. In some places, the subsoil is shallower to limestone than is typical. In areas where the lower part of the subsoil formed in material that has a component of glacial till, the subsoil is brown or reddish brown clay loam. In places, the subsoil and substratum are silty clay loam and silt loam.

Permeability is moderate in the upper part of this soil and slow in the lower part. Runoff in cultivated areas is medium. The surface layer varies in reaction because of local liming practices. The subsoil is neutral to strongly acid. The available water capacity is moderate. The organic matter content is high. The shrink-swell potential of the subsoil is moderate in the upper part and high in the lower part. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content.

In most areas, this soil is cultivated. It has good potential for cultivated crops and for hay and pasture. It has poor to fair potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of conservation tillage, and returning crop residue to the soil help to reduce the loss of soil due to erosion. Returning crop residue or adding other organic material to the soil helps to maintain fertility, to reduce crusting, and to increase water infiltration.

This soil is suitable for use as a source of topsoil. Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil by placing the foundation in material that has low shrink-swell potential, or by extending the foundation to bedrock. Bedrock is a limitation to the use of this soil as a site for dwellings that have a basement.

Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to compensate for the slow movement of effluent. Sufficient filtering material must be maintained between filter lines and bedrock. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water by seepage through cracks in the bedrock.

Capability subclass IIe.

411C2—Ashdale silt loam, 5 to 9 percent slopes, eroded. This is a sloping, well drained soil on convex ridgetops and uneven side slopes. Areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 10 inches thick. The subsoil is about 30 inches thick. In the upper part, it is dark brown and yellowish brown, friable silty clay loam that has a few angular chert pebbles; and in the lower part, it is reddish brown and dark brown, firm silty clay. Brownish yellow dolomitic limestone is at a depth of 40 inches. In some places, the subsoil is shallower to limestone than is typical. In many areas, the surface layer is less than 10 inches thick. In some areas, the lower part of the subsoil formed in material that has a component of glacial till, and the subsoil is brown or reddish brown clay loam. In places, the subsoil and substratum are silty clay loam and silt loam.

Permeability is moderate in the upper part of the soil and slow in the lower part. Runoff in cultivated areas is medium to rapid. The surface layer varies in reaction because of local liming practices. The subsoil is neutral to strongly acid. The available water capacity is moderate. The organic matter content is high. The shrink-swell potential of the subsoil is moderate in the upper part and high in the lower part. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has poor to fair potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to maintain fertility, to reduce crusting, and to increase water infiltration.

This soil is suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil, by placing the foundation in material that has low shrink-swell potential, or by extending the foundation to bedrock. Bedrock is a limitation to the use of this soil as a site for dwellings that have a basement. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to compensate for the slow movement of effluent. Sufficient filtering material must be maintained between the filter lines and bedrock. This soil is not suitable for use as sewage lagoons because of the steepness of slopes and shallowness to bedrock.

Capability subclass IIe.

412B—Ogle silt loam, 2 to 5 percent slopes. This is a gently sloping, well drained soil on convex upland ridgetops, knolls, and short, uneven side slopes. Areas are irregular in shape and range from 2 to about 100 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 12 inches thick. The subsoil is about 48 inches thick. In the upper part, it is dark yellowish brown silty clay loam, and in the lower part, to a depth of 60 inches, it is brown, reddish brown, and yellowish red loam and clay loam. In some places, the surface layer is thinner than is typical. In some places, the silty material extends to a depth of 60 inches; in other places, the silty material is thinner than is typical. In some areas, bedrock is within a depth of 60 inches; in other areas, stratified material or sandy loam glacial till is within that depth. In some areas, slopes are more than 5 percent, and in others they are less than 2 percent.

Included in mapping are small areas of somewhat poorly drained Muscatine soils and poorly drained Comfrey and Sawmill soils. These soils are in drainageways and make up about 5 to 10 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is medium. The available water capacity and the organic matter content are high. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to strongly acid. The shrink-swell potential of the subsoil is moderate. The surface layer is friable and can be worked easily within a fairly wide range in moisture content. This soil is highly susceptible to frost heave.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has good to fair potential for building site development and for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to reduce crusting and facilitates seedbed preparation.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IIe.

415—Orion silt loam. This is a nearly level, somewhat poorly drained soil on flood plains along small streams or on foot slopes adjacent to stream terraces. Areas are irregular in shape and range from 2 to several hundred acres in size. This soil is subject to frequent flooding for brief periods from March through November.

Typically, the surface layer is dark grayish brown silt loam about 9 inches thick. The substratum, to a depth of about 21 inches, is dark grayish brown and brown silt loam. Next is a buried surface layer that is very dark gray silt loam about 6 inches thick. Below that, an intervening substratum layer of dark grayish brown and brown silt loam extends to a depth of about 37 inches. Below that, a buried surface layer of black silt loam extends to a depth of 60 inches. In some places, the substratum is black muck. In a few areas, the buried surface layers are dark grayish brown silt loam. In some areas, this soil formed in loamy sediment.

Included in mapping are small areas of well drained Juneau soils and poorly drained Sawmill and Comfrey soils. Juneau soils are in positions on the landscape similar to those of this Orion soil, and Sawmill and Comfrey soils are in shallow depressions and drainageways. These soils make up 2 to 10 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is slow. This soil is neutral to slightly acid. The available water capacity is very high. The organic matter content is moderately low. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content.

In many areas, this soil is in pasture. It has good potential for cultivated crops where flooding is less frequent than is typical. It has poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Using conservation tillage, returning crop residue to the soil, and protecting the soil from flooding help to reduce soil loss. Returning crop residue or adding other organic material to the soil helps to maintain fertility, reduce crusting, and increase water infiltration.

This soil is suitable for use as pastureland or hayland. However, overgrazing or grazing when the soil is too wet reduces the yield of forage and causes surface compaction, excessive runoff, and poor tilth. Plantings for pasture and hay, proper stocking rates, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition.

This soil is well suited to use as habitat for openland wildlife. Habitat elements are adequate for openland wildlife.

Because of the flooding hazard, this soil is not suited to community development.

Capability subclass IIw.

419A—Flagg silt loam, 0 to 2 percent slopes. This is a nearly level, well drained soil on upland drainage divides. Areas are irregular in shape and range from 2 to 40 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsurface layer is grayish brown silt loam about 3 inches thick. The subsoil extends to a depth of more than 60 inches. In the upper part, it is brown, friable silt loam; in the middle part, it is yellowish brown, friable silty clay loam; and in the lower part, it is brown, friable clay loam. The silty upper part of the subsoil commonly extends from 25 inches to a depth of 50 inches. In places, the middle part of the subsoil is thicker than is typical and extends to a depth of more than 60 inches. In a few places, the lower part of the subsoil is at a shallower depth than is typical, and a brown, calcareous sandy loam or loam substratum is within a depth of 60 inches.

Included in mapping are small areas of somewhat poorly drained Kendall soils and poorly drained Drummer soils. These soils are in shallow depressions and drainageways and make up 2 to 7 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to medium acid. The available water capacity is high. The organic matter content is moderately low. The shrink-swell potential of the subsoil is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. However, the surface tends to crust, or the soil puddles after a hard rain, especially if the soil is tilled when wet.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay, pasture, and trees. It has fair potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. It can be used for the continuous production of row crops because there are few hazards or limitations to this use. Using conservation tillage and returning crop residue to the soil help to reduce the loss of soil due to erosion. Returning crop residue or adding other organic material to the soil helps to improve fertility, to reduce crusting, and to increase water infiltration.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to compensate for the slow movement of effluent. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability class I.

419B—Flagg silt loam, 2 to 5 percent slopes. This is a gently sloping, well drained soil on convex upland ridgetops and side slopes. Areas are irregular in shape and range from 3 to several hundred acres in size.

Typically, the surface layer is dark grayish brown silt loam about 7 inches thick. The subsurface layer is grayish brown silt loam 2 inches thick. The subsoil extends to a depth of more than 60 inches. In the upper part, it is brown, friable silt loam; in the middle part, it is yellowish brown, friable silty clay loam; and in the lower part, it is brown, friable clay loam. The silty upper part of the subsoil commonly extends from 25 inches to a depth of 50 inches. In places, the middle part of the subsoil is thicker than is typical and extends to a depth of more than 60 inches. In a few places, the lower part of the subsoil is at a shallower depth, and a brown, calcareous sandy loam or loam substratum is within a depth of 60 inches. In cultivated areas, material from the upper part of the subsoil has been mixed with the original surface layer by plowing, and the present surface layer is brown silt loam. In some areas, there is no subsurface layer.

Included in mapping are small areas of somewhat poorly drained Kendall soils and poorly drained Drummer soils. These soils are in shallow depressions and drainageways and make up 2 to 9 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to medium acid. The available water capacity is high. The organic matter content is moderately low. The shrink-swell potential of the subsoil is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. However, the surface tends to crust, or the soil puddles after a hard rain, particularly in areas where subsoil material has been mixed into the plow layer.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay, pasture, and trees. It has good potential for the development of habitat for openland and woodland wildlife. This soil has fair potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce the loss of soil due to erosion. Returning crop residue or adding other organic material to the soil helps to maintain fertility, to reduce crusting, and to increase water infiltration.

This soil has good potential for the development of habitat for openland and woodland wildlife. The habitat elements that can provide good food and cover for wildlife are grain and seed crops, domestic grasses and legumes, wild herbaceous plants, and hardwood trees.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to accommodate the slow movement of effluent. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IIe.

419C2—Flagg silt loam, 5 to 9 percent slopes, eroded. This is a sloping, well drained soil on convex upland side slopes. Areas are irregular in shape and range from 2 to 100 acres in size.

Typically, the surface layer is brown silt loam about 7 inches thick. The subsoil extends to a depth of more than 60 inches. In the upper part, it is brown or yellowish brown, friable silt loam; in the middle part, it is yellowish brown, friable silty clay loam; and in the lower part, it is brown, friable clay loam. The silty upper part of the subsoil commonly extends from 25 inches to a depth of 50 inches. In places, the lower part of the subsoil is at a shallower depth, and a brown, calcareous sandy loam substratum is within a depth of 60 inches.

Included in mapping are small areas of somewhat poorly drained Kendall soils. These soils are in small drainageways that extend into areas of this Flagg soil. Kendall soils make up 2 to 4 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral

to medium acid. The available water capacity is high. The organic matter content is moderately low. The shrink-swell potential of the subsoil is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. However, the surface tends to crust, or the soil puddles after a hard rain, particularly in areas where subsoil material has been mixed into the plow layer.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay, pasture, and trees. It has fair to poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce the loss of soil due to erosion. Returning crop residue or adding other organic material to the soil helps to maintain fertility, to reduce crusting, and to increase water infiltration.

This soil is suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to compensate for the slow movement of effluent. This soil is not suitable for use as sewage lagoons because of the steepness of slopes.

Capability subclass IIIe.

429B—Palsgrove silt loam, 2 to 5 percent slopes. This is a gently sloping, well drained soil on upland ridgetops and on short, uneven side slopes. Areas are linear or irregular in shape and range from about 3 to 100 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is dark grayish brown silt loam about 4 inches thick. The subsoil is about 43 inches thick. In the upper part, it is brown, friable silty clay loam, and in the lower part, it is dark reddish brown silty clay and clay. Very pale brown, fractured dolomitic bedrock is at a depth of 55 inches. In some places, stratified sands or glacial drift is above the bedrock. In some areas, the silty material is thinner than is typical, and the bedrock is at a shallower depth. In other areas, the silty material is thicker, and bedrock is below a depth of 60 inches.

Permeability is moderate in the upper part of the subsoil and very slow in the lower part. Runoff in cultivated areas is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil ranges from neutral to strongly acid. The available water capacity is moderate. The organic matter content is moderately low. The shrink-swell potential of the subsoil is moderate in the upper part and high in the lower part. The surface layer is friable, and a seedbed can be easily prepared within a fairly wide range in moisture content.

In most areas, this soil is used for farming. It has good to fair potential for cultivated crops and good potential for hay, pasture, and trees. It has poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to maintain fertility, to reduce crusting, and to facilitate seedbed preparation.

This soil is suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. This soil is not suitable for use as septic tank absorption fields because of the bedrock. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water, and an impervious layer above the bedrock needs to be maintained.

Capability subclass IIe.

429C2—Palsgrove silt loam, 5 to 9 percent slopes, eroded. This is a sloping, well drained soil on side slopes of upland ridges and at the upper end of upland drainageways. Areas are irregular in shape and range from 3 to about 100 acres in size.

Typically, the surface layer is dark grayish brown and brown, friable silt loam about 8 inches thick. The subsoil is about 40 inches thick. In the upper part, it is brown, friable silty clay loam, and in the lower part, it is dark reddish brown silty clay and clay. Very pale brown, fractured dolomitic bedrock is at a depth of 48 inches. In

places, stratified sandy material or reddish glacial drift overlies the bedrock. In some places, the silty material is thinner than is typical, and bedrock is at a shallower depth. In other places, the silty material is thicker than is typical, and the depth to bedrock is more than 60 inches.

Included in mapping are small areas of poorly drained Comfrey soils and somewhat poorly drained Orion soils. These soils are in drainageways that extend into the uplands. They make up 5 to 10 percent of this map unit.

Permeability is moderate in the upper part of the subsoil and very slow in the lower part. Runoff in cultivated areas is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to strongly acid. The available water capacity is moderate. The organic matter content is moderately low. The shrink-swell potential of the subsoil is moderate in the upper part and high in the lower part. Subsoil material commonly has been mixed into the surface layer by plowing, and thus preparing a good seedbed is dependent on optimum moisture conditions. The surface tends to crust or the soil puddles after a hard rain.

In most areas, this soil is used for farming. It has fair potential for cultivated crops and good potential for hay, pasture, and trees. It has poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to improve tilth and to reduce crusting and erosion.

This soil is suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil is suited to use as woodland. Tree seedlings survive and grow well if competing vegetation is controlled or removed. Erosion is the main hazard to planting or harvesting trees.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. This soil is not suitable for use as sanitary facilities because of the steepness of slopes and the moderate depth to bedrock.

Capability subclass IIIe.

440A—Jasper silt loam, 0 to 2 percent slopes. This is a nearly level, well drained soil on rolling uplands and in slightly elevated areas on terraces along streams. Areas are irregular in shape and range from 2 to 200 acres in size.

Typically, the upper part of the surface layer is black silt loam about 9 inches thick, and the lower part is very dark gray silty clay loam 8 inches thick. The upper part of the subsoil is brown or dark yellowish brown silty clay loam and clay loam about 13 inches thick, and the lower part is dark yellowish brown loam, sandy loam, and gravelly loamy sand about 17 inches thick. The substratum, to a depth of 60 inches, is brown to strong brown loamy sand. In some places, the surface layer and the upper part of the subsoil have more sand than is typical. In places, the surface layer is thinner than is typical.

Included in mapping are small areas of somewhat poorly drained La Hogue soils. These soils are in slightly lower areas and make up 5 to 15 percent of this map unit.

Permeability is moderate, and runoff is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is medium acid to neutral. The available water capacity is high. The organic matter content is moderate. The surface layer is friable and can be tilled easily within a wide range in moisture content. However, the surface tends to crust, or the soil puddles after a hard rain.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for small grains, hay, and pasture. It has fair potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Using conservation tillage and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to improve fertility, to reduce crusting, and to increase water infiltration.

This soil is suitable for residential, commercial, and light industrial development. The hazard of frost action is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to accommodate the slow movement of effluent. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability class I.

440B—Jasper silt loam, 2 to 5 percent slopes. This is a gently sloping, well drained soil on rolling uplands and in slightly elevated areas on terraces along streams. Areas are irregular in shape and range from 2 to 150 acres in size.

Typically, the surface layer is black silt loam about 9 inches thick. The subsurface layer is very dark gray silty clay loam about 6 inches thick. The upper part of the subsoil is dark brown silty clay loam and dark yellowish brown clay loam 13 inches thick; the lower part is dark

yellowish brown loam, sandy loam, and gravelly loamy sand 17 inches thick. The substratum, to a depth of 60 inches, is strong brown loamy fine sand and dark brown fine sandy loam. In some places, the surface layer and upper part of the subsoil have more sand than is typical. In places, the surface layer is thinner than is typical.

Included in mapping are small areas of somewhat poorly drained La Hogue soils. These soils are in slightly lower areas and make up 2 to 5 percent of this map unit.

Permeability is moderate, and runoff is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is medium acid to neutral. The available water capacity is high, and the organic matter content is moderate. The surface layer is friable and can be tilled easily within a wide range in moisture content. However, the surface tends to crust, or the soil puddles after a hard rain.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for small grains, hay, and pasture. It has fair potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Contour farming, the use of conservation tillage, and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to improve fertility, to reduce crusting, and to increase water infiltration.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil is suitable for residential, commercial, and light industrial development. The hazard of frost action is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to compensate for the slow movement of effluent. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IIe.

440C2—Jasper silt loam, 5 to 9 percent slopes, eroded. This is a sloping, well drained soil on rolling uplands and terrace breaks. Areas are irregular or linear in shape and range from 2 to 50 acres in size.

Typically, the surface layer is dark brown silty clay loam about 10 inches thick. The subsoil is about 22 inches thick. In the upper part, it is brown and yellowish brown silty clay loam and clay loam, and in the lower part, it is dark yellowish brown loam, sandy loam, and loamy sand. The substratum, to a depth of 60 inches, is strong brown and brown loamy sand. In some places, the surface layer and the upper part of the subsoil have more sand than is typical. In places, the surface layer is thinner than is typical.

Permeability is moderate, and runoff is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is medium acid to neutral. The available water capacity is high. The organic matter content is moderate. The surface layer is friable and can be tilled easily within a wide range in moisture content. However, the surface tends to crust, or the soil puddles after a hard rain, particularly in areas where subsoil material has been mixed into the plow layer.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for small grains, hay, pasture, and trees. It has fair potential for building site development and for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to maintain fertility, to reduce crusting, and to increase water infiltration.

This soil is suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil is suitable for residential, commercial, and light industrial development. The hazard of frost action is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to compensate for the slow movement of effluent. This soil is not suitable for use as sewage lagoons because of the steepness of slopes.

Capability subclass IIIe.

451—Lawson silt loam. This is a nearly level, somewhat poorly drained soil on flood plains along the Pecatonica River and along small streams, mainly in the western part of Winnebago County. Areas are linear or irregular in shape and range from 2 to several hundred acres in size. This soil is subject to occasional flooding for brief periods from March through November.

Typically, the upper part of the surface layer is black silt loam 6 inches thick, and the lower part is very dark grayish brown silt loam 21 inches thick. The substratum, to a depth of about 60 inches, is mixed very dark grayish brown and dark grayish brown, friable silt loam. In some places, dark colors extend to a depth of 60 inches or more. In some places, the surface layer has more sand

than is typical, and in other places this soil has more clay throughout. In some small upland stream valleys, the surface layer is light colored.

Included in mapping are small areas of poorly drained Sawmill and Comfrey soils in lower positions adjacent to this Lawson soil, mainly on the larger bottom lands. These soils make up 5 to 10 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is slow. This soil is neutral or mildly alkaline. The available water capacity is very high, and the organic matter content is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for small grains, hay, and pasture. It has poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Drainage is needed for optimum yields. Surface ditches drain a few large areas. Tile drainage is effective if suitable outlets are available. Returning crop residue or adding other organic material to the soil helps to improve fertility, to reduce crusting, and to increase water infiltration.

This soil is suitable for use as pastureland or hayland. However, overgrazing or grazing when the soil is too wet reduces the production of forage and causes surface compaction, excessive runoff, and poor tilth. Plantings for pasture and hay, proper stocking rates, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition.

This soil can be used as habitat for openland or woodland wildlife. It is suited to woody and herbaceous plants. Wildlife habitat developments can include trees and shrubs as well as grasses and legumes.

This soil is seasonally wet and is periodically flooded. It is not suited to building site development. Onsite sewage disposal systems function poorly or fail completely because of the seasonal high water table and the seasonal flooding.

Capability subclass IIw.

490—Odell silt loam. This is a deep, nearly level, somewhat poorly drained soil on upland divides between well drained soils on ridges and knobs and poorly drained soils on flats and in depressions. Areas are irregular in shape and range from 5 to 180 acres in size.

Typically, the upper part of the surface layer is very dark gray silt loam about 7 inches thick, and the lower part is very dark grayish brown clay loam about 6 inches thick. The subsoil is about 25 inches thick. In the upper part, it is brown, friable clay loam, and in the lower part, it is brown, friable loam. The substratum, to a depth of about 60 inches, is light yellowish brown and pale brown, calcareous sandy loam. In some places, the subsoil is deeper to calcareous sandy loam than is typical. In a few areas, the surface layer is less than 10 inches thick. In some areas, the subsoil formed in thicker silty material. In other areas, the substratum is loam.

Included in mapping are small areas of well drained Parr soils and poorly drained Selma soils. Parr soils are on rises and mounds upslope from this Odell soil, and Selma soils are in depressions and on low-lying upland flats. The included soils make up 5 to 10 percent of the map unit.

Permeability is moderately slow, and runoff in cultivated areas is slow. The surface layer varies widely in reaction because of local liming practices. The subsoil is medium acid to moderately alkaline. The available water capacity is moderate. The organic matter content is high. The shrink-swell potential is moderate in the subsoil. The surface layer is friable and is easy to till; however, the surface tends to crust, or the soil puddles after a hard rain, particularly in areas where heavy equipment has been used. The root zone is restricted by calcareous glacial till below a depth of about 38 inches.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. This soil has poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Using conservation tillage and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to improve fertility, to reduce crusting, and to increase water infiltration.

The seasonal water table limits the use of this soil as a site for dwellings with or without a basement. A drainage system needs to be installed to help overcome this limitation. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. A septic tank absorption field will not function properly on this soil unless the seasonal water table is lowered or the absorption field is placed in a seepage bed above the water table. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to accommodate the slow movement of effluent. This soil is not suitable for use as sewage lagoons because the seasonal water table is high.

Capability class I.

504C—Sogn silt loam, 4 to 12 percent slopes. This is a sloping, somewhat excessively drained soil on the lower part of long side slopes. Areas are irregular in shape and range from 2 to 60 acres in size.

Typically, the upper part of the surface layer is very dark gray silt loam about 8 inches thick, and the lower part is very dark grayish brown silt loam about 12 inches thick. Brownish yellow dolomitic bedrock, which is fractured in the upper part and becomes more consolidated with depth, is at a depth of 10 inches. In some places, the lower part of the surface layer is deeper to bedrock than is typical. In a few areas, the surface layer is black

loam, loamy sand, or sand. In places, a subsoil underlies the surface layer; it is brown silty clay loam in the upper part and dark reddish brown, very firm clay in the lower part. In a few areas, the surface layer is dark grayish brown silt loam or dark yellowish brown silty clay loam.

Included in mapping are small areas of deep, well drained Griswold and Winnebago soils. These soils are in positions on the landscape similar to those of this Sogn soil, but they formed in glacial till instead of in the residuum of dolomitic bedrock, which is the parent material of Sogn soils. Griswold and Winnebago soils make up 2 to 5 percent of this map unit.

Permeability is moderate, and runoff in pastureland is medium. The surface layer generally is neutral or mildly alkaline. The available water capacity is very low. The organic matter content is moderate. The root zone generally is restricted by the dolomitic bedrock below a depth of about 14 inches.

In most areas, this soil is used as pasture. It has poor potential for cultivated crops and for small grains and hay. It has very poor potential for the development of habitat for openland wildlife and fair to poor potential for recreation uses. This soil has poor potential for building site development and as sites for sanitary facilities.

This soil is not suited to corn, soybeans, small grains, or grasses and legumes. Droughtiness, rocks on the surface, and outcrops of bedrock are limitations to the use of this soil for cultivated crops.

This soil is suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil is suitable for use as sites for recreation facilities, such as camp areas, picnic areas, and paths and trails. It has poor potential for playgrounds because of the shallowness to rock.

Shallowness to rock is a severe limitation to the use of this soil for dwellings with or without a basement. Dwellings can be constructed on this soil, but the excavation cost will be high. In the upper 2 feet, the bedrock generally is rippable using construction equipment. This soil is not suitable for use as onsite waste disposal systems because of the shallowness to rock. The underlying bedrock is a good source of agricultural lime and crushed rock for use in road construction.

Capability subclass VIIs.

504E—Sogn silt loam, 12 to 30 percent slopes. This is a moderately steep, somewhat excessively drained soil on short side slopes near stream valleys. Areas are linear to paraboloid in shape and range from 4 to 50 acres in size.

Typically, the surface layer is very dark gray or black silt loam or loam about 8 inches thick. Brownish yellow dolomitic bedrock, which is fractured in the upper part and becomes more consolidated with depth, is at a depth of 8 inches. In some places, the bedrock outcrops at the surface, and the surface layer is black, channery or flaggy loam. In some areas, slopes are more than 30 percent. In a few places, the surface layer is deeper to bedrock than is typical. In a few areas, the surface layer is black loam, loamy sand, or sand. In some places, a subsoil underlies the surface layer; it is brown, firm silty clay loam in the upper part and dark reddish brown, very firm clay in the lower part. In a few areas, the surface layer is dark grayish brown silt loam or dark yellowish brown silty clay loam. In a few isolated places near the Sugar River Valley, the soil is underlain by fractured sandstone.

Permeability is moderate, and runoff in pastureland is rapid. The surface layer generally is neutral to mildly alkaline, because it directly overlies the alkaline bedrock. The available water capacity is very low. The organic matter content is moderate. The root zone generally is restricted by the dolomitic bedrock below a depth of about 10 inches.

In most areas, this soil is used as pasture. It has poor potential for cultivated crops and hay. It has good potential for use as a nature area. It is not suited to building site development or to use as sites for sanitary facilities.

This soil is not suited to corn, soybeans, small grains, or grasses and legumes. Droughtiness, rocks on the surface, and outcrops of bedrock are limitations to the use of this soil for cultivated crops.

This soil is not suited to use as pastureland because of droughtiness and shallowness to bedrock. However, it has fair potential for this use if proper stocking rates, pasture rotation, and timely deferment of grazing are used.

This soil is well suited to development as nature areas that have esthetic value. In many places, it has never been tilled and has only occasionally been grazed by livestock. The native prairie plant community can easily be reestablished through site preparation, selective weeding of woody plants, burning, and seeding native plants.

If the native vegetation is maintained, this soil is suitable for use as habitat for openland wildlife. However, it has poor potential for development of habitat elements such as a grass-legume cover or a woody cover.

Capability subclass VIIs.

505C2—Dunbarton silt loam, 4 to 7 percent slopes, eroded. This is a sloping, well drained soil on upland side slopes and ridges. Areas are irregular in shape and range from 5 to 30 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsoil is about 13 inches thick. In the upper part, it is dark yellowish brown, firm silty clay loam; in the next part, it is brown, very firm heavy clay loam; and in the lower part, it is dark reddish

brown clay. Fractured dolomitic limestone is at a depth of 19 inches. In some places, the subsoil is thicker than is typical, and the limestone is at a depth of more than 20 inches. In some places, the surface layer is loamy.

Permeability is moderate in the upper part and moderately slow in the subsoil. This soil is medium acid to mildly alkaline. Runoff is medium to rapid, and the available water capacity is low. The shrink-swell potential of the subsoil is moderate in the upper part and high in the lower part. This soil is droughty, and productivity is low. The root zone is restricted by the bedrock below a depth of 12 to 20 inches. Tillage is difficult in places because of the outcrops of bedrock. The organic matter content is moderately low.

In most areas, this soil is used for farming. It has poor potential for cultivated crops and for hay, pasture, and trees. It has poor potential for building site development and as sites for sanitary facilities. This soil has fair potential for most recreation uses.

If this soil is used for cultivated crops, erosion can cause further damage. Contour farming, the use of a conservation cropping system and conservation tillage, and returning crop residue to the soil help to reduce the loss of soil due to erosion.

This soil is suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

The shallowness to bedrock and droughtiness are limitations to the use of this soil as woodland. However, this soil is suited to upland oaks.

This soil can be used as camp areas and picnic areas. The surface compacts easily under heavy use. This soil is not suitable for use as playgrounds because of the steepness of slopes and shallowness to bedrock. This soil is muddy and slippery when wet.

This soil is fairly suited to the development of a grassy or herbaceous cover for openland wildlife. It is poorly suited to a tree or shrub cover because the shallowness to bedrock severely limits the number of adapted species.

This soil can be used for building site development if the foundation is extended to bedrock. The shallowness to bedrock is a limitation for dwellings that have a basement. Frost action is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. This soil is too shallow to bedrock for use as septic tank absorption fields. Underground water pollution is a hazard if this soil is used for onsite sewage disposal. However, a central sewage system can be used, thus making onsite sewage disposal unnecessary. Constructing roads and streets is difficult because of the steepness of slopes and the shallowness to bedrock. In the upper few feet, the bedrock generally is rippable and can be removed.

Capability subclass IVe.

505D2—Dunbarton silt loam, 7 to 12 percent slopes, eroded. This is a sloping, well drained soil on upland side slopes and shoulder slopes. Areas are irregular in shape and range from 5 to 60 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 5 inches thick. The subsoil is about 11 inches thick. In the upper part, it is dark yellowish brown, firm silty clay loam; in the middle part, it is brown, very firm clay loam; and in the lower part, it is dark reddish brown, very firm clay. Fractured dolomitic limestone is at a depth of 16 inches. In some areas, the subsoil is thicker than is typical, and the limestone is at a depth of more than 20 inches. In places, the surface layer is black loam, and the subsoil is less clayey than is typical.

Permeability is moderate in the upper part and moderately slow in the lower part of the subsoil. The subsoil is medium acid to slightly alkaline. Runoff is medium to rapid, and the available water capacity is low. Organic matter content is moderately low. The shrink-swell potential of the subsoil is moderate in the upper part and high in the lower part. Tillage is difficult in places because of the outcrops of bedrock. This soil is droughty, and productivity is low. The root zone is restricted by the bedrock below a depth of 12 to 20 inches.

In most areas, this soil is used for farming. It has poor potential for cultivated crops and fair potential for hay, pasture, and trees. It has poor potential for building site development, as sites for sanitary facilities, and for recreation uses.

This soil is not suited to corn and soybeans. It is droughty, and productivity is low. If this soil is used for corn and soybeans, erosion can cause further damage. Contour farming, the use of conservation tillage, and returning crop residue to the soil help to reduce erosion.

This soil is suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

The shallowness to bedrock and droughtiness are limitations to the use of this soil as woodland. However, this soil is suited to upland oaks.

This soil can be used as camping areas. The surface compacts easily under heavy use. This soil is not suitable for use as playgrounds because it is too steep and is muddy and slippery when wet.

This soil is fairly suited to the development of a grassy or herbaceous cover for openland wildlife. It is poorly suited to a tree or shrub cover because the shallowness to bedrock severely limits the number of adapted species.

This soil can be used for building site development if the foundation is extended to the bedrock. Shallowness to bedrock is a limitation for dwellings that have a basement. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. This soil is too shallow to bedrock for use as septic tank absorption fields. Underground water pollution is a hazard if this soil is used for onsite sewage disposal. However, a central sewage system can be used, thus making onsite sewage disposal unnecessary. Constructing roads and streets is difficult because of the steepness of slopes and the shallowness to bedrock. In the upper few feet, the bedrock generally is rippable and can be removed.

Capability subclass VIe.

505E2—Dunbarton silt loam, 12 to 20 percent slopes, eroded. This is a moderately steep, well drained soil on side slopes of ravines and ridges. Areas are linear in shape and range from 5 to 30 acres in size.

Typically, the surface layer is dark brown heavy silt loam about 6 inches thick. The subsoil is about 10 inches thick. In the upper part, it is dark yellowish brown, firm silty clay loam, and in the lower part, it is dark reddish brown, very firm clay. Fractured dolomitic limestone is at a depth of 16 inches. In some places, the subsoil is thicker than is typical, and the bedrock is at a depth of more than 20 inches. In places, the surface layer is black loam, and the subsoil is less clayey. In many places, bedrock outcrops are common.

Permeability is moderate in the upper part of this soil, and it is moderately slow in the lower part of the subsoil. Runoff is medium to rapid, and the available water capacity is low. The organic matter content is moderately low. The shrink-swell potential is moderate in the upper part of the subsoil and high in the lower part. The subsoil is medium acid to slightly alkaline. This soil is droughty, and productivity is low. The root zone is restricted by the bedrock below a depth of 12 to 20 inches.

In most areas, this soil is used as pasture and woodland. It has poor potential for cultivated crops. It has poor potential for building site development and as sites for sanitary facilities.

This soil is suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

The shallowness to bedrock and droughtiness are limitations to the use of this soil as woodland. However, this soil is suited to upland oaks.

The steepness of slopes and shallowness to bedrock are limitations to the use of this soil for recreation uses.

This soil is poorly suited to the development of a grassy or herbaceous cover for openland wildlife. It is poorly suited to a tree or shrub cover because the shallowness to bedrock severely limits the number of adapted species.

This soil is not suitable for use as building sites or for use as septic tank filter fields because of the steepness of slopes and shallowness to bedrock. The fractured limestone bedrock, which is at a depth of less than 20 inches, hinders the construction of sewage lagoons. Constructing roads and streets is difficult because of the steepness of slopes and the shallowness to bedrock. In the upper few feet, the bedrock generally is rippable and can be removed.

Capability subclass VIIe.

506A—Hitt silt loam, 0 to 2 percent slopes. This is a nearly level, well drained soil on slightly convex ridgetops on uplands. Areas are irregular in shape and range from 2 to 20 acres in size.

Typically, the surface layer is very dark gray silt loam about 15 inches thick. The subsoil is about 39 inches thick. In the upper part, it is dark brown silty clay loam; in the middle part, it is brown clay loam and sandy clay loam; and in the lower part, it is dark reddish brown clay loam and clay. Fractured dolomitic limestone bedrock is at a depth of 54 inches. In some places, the surface layer is thinner than is typical. In a few areas, the fractured dolomitic limestone is at a depth of 20 to 40 inches; in some areas, it is at a depth of more than 60 inches.

Permeability is moderate in the upper part of the subsoil and slow in the lower part. Runoff in cultivated areas is medium. The organic matter content is moderate. The available water capacity is high. The shrink-swell potential of the subsoil is moderate. The surface layer varies widely in reaction because of local liming practices. The subsoil is strongly acid to neutral. The surface layer is friable and can be tilled easily. The surface tends to crust, or the soil puddles after a hard rain.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for small grains, hay, and pasture. It has good potential for recreation uses and fair to poor potential for building site development and as sites for sanitary facilities.

This soil is suited to cultivated crops, small grains, and grasses and legumes. Using conservation tillage and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to improve fertility, to reduce crusting, and to increase water infiltration.

This soil is suited to paths and trails, camping areas, picnic areas, and playgrounds.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil, by extending the foundation

to bedrock, or by placing the foundation in material that has low shrink-swell potential. The moderate depth to bedrock is a limitation for dwellings that have a basement. Low strength is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. Because of the moderate depth to bedrock, this soil is not suited to use as septic tank absorption fields. The bottom of sewage lagoons over the bedrock needs to be sealed to prevent the contamination of ground water.

Capability class I.

506B—Hitt silt loam, 2 to 5 percent slopes. This is a gently sloping, well drained soil on the upper part of convex side slopes and on ridgetops on uplands. Areas are irregular in shape and range from 2 to 60 acres in size.

Typically, the surface layer is very dark gray and very dark grayish brown silt loam about 13 inches thick. The subsoil is about 39 inches thick. In the upper part, it is dark brown silty clay loam; in the middle part, it is brown sandy clay loam; and in the lower part, it is dark reddish brown clay loam and clay. Fractured dolomitic limestone bedrock is at a depth of 52 inches. In some places, the surface layer is thinner than is typical. In some places, the fractured dolomitic limestone is within a depth of 20 to 40 inches; in other places, it is at a depth of more than 60 inches.

Permeability is moderate in the upper part of the subsoil and slow in the lower part. Runoff in cultivated areas is medium. The organic matter content is moderate, and the available water capacity is high. The shrink-swell potential of the subsoil is moderate. The surface layer varies widely in reaction because of local liming practices. The subsoil is strongly acid to neutral. The surface layer is friable and can be tilled easily; however, the surface tends to crust, or the soil puddles after a hard rain.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has fair to good potential for recreation uses and fair to poor potential for building site development and as sites for sanitary facilities.

This soil is well suited to cultivated crops, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to maintain fertility, to reduce crusting, and to increase water infiltration.

This soil is suited to paths and trails, camping areas, picnic areas, and playgrounds. Playgrounds should be established in the less sloping areas of this unit.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil, by extending the foundation to bedrock, or by placing the foundation in material that has low shrink-swell potential. Low strength is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. Because of the moderate depth to bedrock, this soil is not suited to use as septic tank absorption fields. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IIe.

506C2—Hitt silt loam, 5 to 9 percent slopes, eroded. This is a sloping, well drained soil on convex side slopes on uplands. Areas are irregular in shape and range from 2 to 30 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsoil is about 35 inches thick. In the upper part, it is brown clay loam and sandy clay loam, and in the lower part, it is dark reddish brown clay loam and clay. Fractured dolomitic limestone bedrock is at a depth of 44 inches. In some places, the surface layer is thinner than is typical.

Included in mapping are small areas of moderately deep Rockton and Dodgeville soils. These soils are in positions on the landscape similar to those of this Hitt soil, but they have bedrock within a depth of 40 inches. Rockton and Dodgeville soils make up 2 to 5 percent of this map unit.

Permeability is moderate in the upper part of the subsoil and slow in the lower part. Runoff in cultivated areas is medium. The organic matter content is moderate. The available water capacity is high. The shrink-swell potential of the subsoil is moderate. The surface layer varies widely in reaction because of local liming practices. The subsoil is strongly acid to neutral. The surface layer is friable and can be tilled easily; however, the surface tends to crust or the soil puddles after a hard rain.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has good potential for most recreation uses and fair to poor potential for building site development and as sites for sanitary facilities.

This soil is suited to cultivated crops, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to maintain fertility, to reduce crusting, and to increase water infiltration.

This soil is suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil is suited to paths and trails, camping areas, and picnic areas. Playgrounds should be established in the less sloping areas of this unit.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil, by extending the foundation to bedrock, or by placing the foundation in material that has low shrink-swell potential. Low strength is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. This soil is not suitable for use as septic tank absorption fields because of the moderate depth to bedrock. This soil is not suitable for use as sewage lagoons because of the steepness of slopes.

Capability subclass IIe.

533—Urban land. This map unit consists of areas covered by buildings and pavement. Areas of Urban land are mainly in and near the cities of Rockford and Belvidere. Some large industrial plants are located outside the urban area.

The soils in areas of Urban land have been so altered by cuts and fills for urban development that identification of these soils is not feasible. More than 75 percent of this map unit is paved areas and buildings. The paved areas mainly consist of parking lots that surround industrial plants, educational institutions, and shopping centers. Most of these areas are nearly level to sloping, but a few areas are strongly sloping.

Runoff generally is very rapid in areas of Urban land. The paved areas commonly are designed to lead runoff into storm drainage systems. However, some of these drainage systems have not been properly constructed or maintained, and the additional runoff results in severe erosion of the adjacent soils. The increased runoff from paved areas increases the flooding hazard. Because runoff is rapid, the water available for trees and shrubs in areas of Urban land generally is low.

Vegetation consists mainly of grassed borders and widely spaced trees and shrubs. Vegetated areas make up less than 25 percent of this map unit. Various species of weeds and grasses are in a few idle areas along the edge of built-up areas.

This unit is not assigned to a capability subclass.

561B—Whalan and NewGlarus silt loams, 2 to 5 percent slopes. This map unit consists of moderately deep, gently sloping, well drained soils on convex upland ridges. The areas are irregular in shape and range from 2 to 100 acres in size. These soils are intermingled on the landscape, and the pattern is irregular. In some areas, the soils could have been mapped separately, but there was little value in separating them. Individual areas consist entirely of Whalan soil, of NewGlarus soil, or of both soils.

Typically, the surface layer of the Whalan soil is dark grayish brown silt loam about 10 inches thick. The subsoil is about 28 inches thick. In the upper part, it is brown, friable silty clay loam; in the middle part, it is brown, friable sandy clay loam; and in the lower part, it is strong brown, firm clay. Fractured dolomitic bedrock is at a depth of 38 inches. In places, the subsoil is more than 40 inches deep to bedrock. In some places, the lower part of the subsoil is more than 6 inches thick.

Typically, the surface layer of the NewGlarus soil is brown silt loam about 12 inches thick. The subsoil is about 25 inches thick. In the upper part, it is dark yellowish brown and brown, friable silty clay loam; in the middle part, it is reddish brown, firm silty clay loam; and in the lower part, it is reddish brown and strong brown, firm clay. Fractured dolomite is at a depth of 37 inches. In some places, ths subsoil is more than 40 inches deep to bedrock. In places, the lower part of the subsoil is less than 10 inches thick.

Included in mapping are the deep, well drained Westville and Pecatonica soils. These soils formed in loamy glacial drift, are deep to bedrock, and are in positions on the landscape similar to those of Whalan and NewGlarus soils. They make up 5 to 10 percent of this map unit.

Permeability is moderate in the upper part of these soils. In the lower part of the subsoil of the NewGlarus soil, permeability is moderately slow, and in the lower part of the subsoil of the Whalan soil, it is slow. Runoff in cultivated areas is medium. The available water capacity is moderate in the Whalan soil, and it is low in the NewGlarus soil. The organic matter content is moderately low in the NewGlarus soil, and it is low in the Whalan soil. These soils are neutral to strongly acid. The shrink-swell potential in the subsoil of the Whalan soil is low in the upper part and high in the lower part. The shrink-swell potential in the subsoil of the NewGlarus soil is moderate in the upper part and high in the lower part. The root zone is restricted by fractured dolomitic bedrock below a depth of about 38 inches.

In most areas, these soils are used for farming. They have fair potential for cultivated crops and fair to good potential for hay, pasture, and trees. The Whalan soil has good to fair potential for building site development and poor potential for use as septic tank absorption fields. The NewGlarus soil has poor potential for building site development and for use as septic tank absorption fields.

These soils are suited to corn, soybeans, small grains, and grasses and legumes. The use of conservation tillage and returning crop residue to the soil help to reduce the loss of soil due to erosion.

These soils are suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to

keep pasture and soil in good condition and help to control erosion.

The Whalan soil is well suited to use as a site for dwellings without a basement. Bedrock limits the depth of excavations for dwellings with a basement. Shrinking and swelling are a limitation to the use of the NewGlarus soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil, by extending the foundation to bedrock, or by placing it in material that has low shrink-swell potential. Low strength and frost action are limitations in using these soils for local roads and streets. These limitations can be overcome by replacing the base material. If these soils are used as sites for septic tank absorption fields, the absorption area needs to be large enough to accommodate the slow movement of effluent. The absorption field needs to be designed to eliminate the possibility of ground water contamination caused by the shallowness to bedrock. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing. If these soils are used for sewage lagoons, an impervious layer needs to be placed above the bedrock.

Capability subclass IIe.

561C2—Whalan and NewGlarus silt loams, 5 to 9 percent slopes, eroded. This map unit consists of moderately deep, sloping, well drained soils on convex side slopes. The areas are irregular in shape and range from 2 to more than 100 acres in size. These soils are intermingled on the landscape, but in an irregular pattern. In some areas, these soils could have been mapped separately, but there was little value in separating them. Individual areas consist entirely of the Whalan soil, of the NewGlarus soil, or of both soils.

Typically, the surface layer of the Whalan soil is dark grayish brown and light brownish gray silt loam about 4 inches thick. The subsoil is about 32 inches thick. In the upper part, it is brown, friable silty clay loam that has a noticeable amount of sand; in the middle part, it is brown, friable sandy clay loam; and in the lower part, it is strong brown, firm clay. Fractured dolomitic bedrock is at a depth of 36 inches. In some places, the subsoil is more than 40 inches deep to bedrock; in other places, it is shallower to bedrock than is typical. In some places, the lower part of the subsoil is more than 6 inches thick.

Typically, the surface layer of the NewGlarus soil is brown silt loam about 9 inches thick. The subsoil is about 27 inches thick. In the upper part, it is dark yellowish brown and brown, friable silty clay loam; in the middle part, it is reddish brown, firm silty clay loam; and in the lower part, it is reddish brown and strong brown, firm clay. Fractured dolomitic bedrock is at a depth of 36 inches. In some places, the subsoil is more than 40 inches deep to bedrock. In places, the lower part of the subsoil is less than 10 inches thiek. In areas where material from the upper part of the subsoil has been mixed into the original surface layer by plowing, the present surface layer is dark yellowish brown silty clay loam.

Included in mapping are the deep Westville and Pecatonica soils. These soils are well drained and formed in loamy glacial drift. They are in positions on the landscape similar to those of Whalan and NewGlarus soils. They make up 5 to 10 percent of the map unit.

Permeability is moderate in the upper part of these soils. It is moderately slow in the lower part of the subsoil of the NewGlarus soil, and it is slow in the lower part of the subsoil of the Whalan soil. Runoff in cultivated areas is medium. The available water capacity is moderate in the Whalan soil, and it is low in the NewGlarus soil. The organic matter content is moderately low in the NewGlarus soil, and it is low in the Whalan soil. These soils are neutral to strongly acid. The shrink-swell potential in the subsoil of the Whalan soil is low in the upper part and high in the lower part. The shrink-swell potential in the subsoil of the NewGlarus soil is moderate in the upper part and high in the lower part. The root zone is restricted by bedrock below a depth of about 36 inches.

In most areas, these soils are used for farming. They have fair potential for cultivated crops and fair to good potential for hay, pasture, and trees. The Whalan soil has good to fair potential for building site development. The NewGlarus soil has poor potential for building site development. Both soils have poor potential as sites for sanitary facilities.

These soils are suited to corn, soybeans, small grains, and grasses and legumes. The erosion hazard and the low available water capacity are the major limitations to the use of these soils for farming. Contour farming, the use of conservation tillage, and returning crop residue to the soil help to reduce the loss of soil due to erosion.

These soils are suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

The Whalan soil is well suited to use as a site for dwellings that do not have a basement. Bedrock limits the depth of excavations for dwellings that have a basement. The NewGlarus soil can be used for building site development by extending the foundation to bedrock, by designing the foundation to withstand the shrinking and swelling of the soil, or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using these soils for local roads and streets. These limitations can be overcome by replacing the base material. If these soils are used as a site for septic tank absorption fields, the absorption area needs to be large enough to accommodate the slow movement of effluent and to eliminate the possibility of ground-water contamination caused by the shallowness to bedrock. Slope is a limitation for sewage lagoons.

This limitation can be overcome by smoothing. If these soils are used for sewage lagoons, an impervious layer needs to be placed above the bedrock.

Capability subclass IIIe.

561D2—Whalan and NewGlarus silt loams, 9 to 15 percent slopes, eroded. This map unit consists of moderately deep, strongly sloping, well drained soils on convex side slopes adjacent to incised drainageways. The areas are irregular in shape and range from 2 to 200 acres in size. These soils are intermingled on the landscape in an irregular pattern. In some areas, these soils could have been mapped separately, but there was no value in separating them. Individual areas consist entirely of the Whalan soil, of the NewGlarus soil, or of both soils.

Typically, the surface layer of the Whalan soil is dark grayish brown and brown silt loam about 6 inches thick. The subsoil is about 21 inches thick. In the upper part, it is brown, friable silty clay loam and clay loam, and in the lower part, it is strong brown, firm clay. Shattered dolomite bedrock is at a depth of 27 inches. In places, the subsoil is more than 40 inches deep to bedrock. In some areas, the subsoil is shallower to bedrock than is typical.

Typically, the surface layer of the NewGlarus soil is brown silt loam or silty clay loam about 7 inches thick. The subsoil is about 23 inches thick. In the upper part, it is brown silty clay loam, and in the lower part, it is reddish brown and strong brown, firm clay. Fractured dolomite bedrock is at a depth of 30 inches. In some places, the subsoil is deeper to bedrock than is typical. In many places, the lower part of the subsoil is less than 10 inches thick. In areas where material from the upper part of the subsoil has been mixed into the original surface layer by plowing, the present surface layer is dark yellowish brown silty clay loam.

Included in mapping are small areas of deep, well drained Westville and Pecatonica soils. These soils formed in loamy glacial drift, are deep to bedrock, and are in positions on the landscape similar to those of the Whalan and NewGlarus soils. Areas where bedrock outcrops at the surface are shown on the soil maps with a spot symbol. The included soils make up 5 to 10 percent of this map unit.

Permeability is moderate in the upper part of these soils. In the lower part of the subsoil of the NewGlarus soil, permeability is moderately slow, and in the lower part of the subsoil of the Whalan soil, it is slow. Runoff in cultivated areas is medium to rapid. The available water capacity is low in the NewGlarus soil and moderate in the Whalan soil. The organic matter content is moderately low in the NewGlarus soil and low in the Whalan soil. These soils are neutral to strongly acid. The shrink-swell potential in the subsoil of the Whalan soil is low in the upper part and high in the lower part. The shrink-swell potential in the subsoil of the NewGlarus soil is moderate in the upper part and high in the lower part. The root zone is restricted by bedrock below a depth of 27 inches.

In most areas, these soils are used for farming. They have fair to poor potential for cultivated crops and fair potential for hay and pasture. They have good to fair potential for use as woodland and fair to poor potential for building site development and as sites for sanitary facilities.

These soils are better suited to grasses and legumes than to corn, soybeans, or small grains. The erosion hazard, the strong slopes, and the low available water capacity are the major limitations to the use of these soils for farming.

These soils are suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

These soils are suited to use as woodland. In a few small areas, they are in native hardwoods. Tree seedlings survive and grow well if competing vegetation is controlled or removed. Erosion is the only hazard in planting or harvesting trees.

These soils can be used for openland or woodland wildlife habitat. They are suited to woody and herbaceous plants. Wildlife habitat development can include trees and shrubs as well as grasses and legumes.

The Whalan soil is suited to use as a site for dwellings that do not have a basement if the slopes are smoothed. Bedrock limits the depth of excavations for dwellings that have a basement. Shrinking and swelling are a limitation to the use of the NewGlarus soil as building sites. The NewGlarus soil can be used for building site development by extending the foundation to bedrock, by designing the foundation to withstand the shrinking and swelling of the soil, or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using these soils for local roads and streets. These limitations can be overcome by replacing the base material. If these soils are used as a site for septic tank absorption fields, the absorption area needs to be large enough to accommodate the slow movement of effluent and to eliminate the possibility of ground-water contamination caused by the shallowness to bedrock. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing. If these soils are used for sewage lagoons, an impervious layer needs to be placed above the bedrock.

Capability subclass IVe.

566B—Rockton and Dodgeville soils, 1 to 5 percent slopes. This map unit consists of moderately deep, gently sloping, well drained soils on upland ridges. The areas are irregular in shape and range from 2 to 40 acres in size. These soils are intermingled on the land-

scape in an irregular pattern. In some areas, these soils could have been mapped separately, but there was no value in separating them. Individual areas consist entirely of the Rockton soil, of the Dodgeville soil, or of both soils.

Typically, the surface layer of the Rockton soil is very dark gray loam about 10 inches thick. The subsoil is about 15 inches thick. In the upper part, it is dark yellowish brown clay loam; in the middle part, it is dark brown clay loam; and in the lower part, it is dark brown clay. Fractured dolomitic bedrock is at a depth of 25 inches. In many places, the bedrock is at a depth of about 30 inches; but, in some places, it is at a depth of more than 40 inches or less than 20 inches.

Typically, the surface layer of the Dodgeville soil is very dark grayish brown and dark brown silt loam about 12 inches thick. The subsoil is about 24 inches thick. It is brown silty clay loam in the upper part and dark reddish brown silty clay and clay in the lower part. Very pale brown, fractured dolomitic bedrock is at a depth of 36 inches. In some places, bedrock is at a depth of more than 40 inches, and in other places, it is at a depth of less than 20 inches.

Included in mapping are small areas of the deep Winnebago and Argyle soils. Winnebago and Argyle soils formed in clay loam glacial material and do not have bedrock within a depth of 60 inches. These soils make up 5 to 10 percent of this map unit.

Permeability is moderate in the Rockton soil and moderately slow in the Dodgeville soil. Runoff in cultivated areas is medium. The available water capacity is low. The organic matter content is high in the Dodgeville soil and moderate in the Rockton soil. The shrink-swell potential in the subsoil is moderate in the upper part and high in the lower part. These soils are neutral to strongly acid.

In most areas, these soils are used for farming. They have fair potential for cultivated crops and fair to good potential for hay and pasture. These soils have poor to fair potential for building site development and as sites for sanitary facilities.

These soils are suited to corn, soybeans, small grains, and grasses and legumes. The major limitations to farming are the hazard of erosion and the low available water capacity. These soils are somewhat droughty because of the low available water capacity and the loss of water as runoff. Contour farming, the use of conservation tillage, and returning crop residue to the soil help to reduce the loss of soil due to erosion and help to conserve moisture.

These soils are suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

Shrinking and swelling are a limitation to the use of these soils as building sites. This limitation can be overcome by designing the foundation to withstand the shrinking and swelling of the soil, by placing the foundation in material that has low shrink-swell potential, or by extending the foundation to bedrock. Bedrock limits the depth of excavations for dwellings that have a basement. Low strength and frost action are limitations in using these soils for local roads and streets. These limitations can be overcome by replacing the base material. If these soils are used as septic tank absorption fields, the hazard of ground-water pollution is severe. Fractures in the bedrock allow contaminants to pollute the underground water supply. The shallowness to bedrock is a severe limitation to storing effluent in these soils. A self-contained sewage disposal system or a sanitary sewer would help to overcome this problem.

Capability subclass IIe.

566C2—Rockton and Dodgeville soils, 5 to 9 percent slopes, eroded. This map unit consists of moderately deep, sloping soils on upland ridges and side slopes. In most areas, this unit is dissected by shallow drainageways. The areas are irregular in shape and range from 2 to 60 acres in size. These soils are intermingled on the landscape but in an irregular pattern. In some areas, these soils could have been mapped separately, but there was no value in separating them. Individual areas consist entirely of the Rockton soil, of the Dodgeville soil, or of both soils.

Typically, the surface layer of the Rockton soil is dark brown loam about 9 inches thick. The subsoil is about 15 inches thick. In the upper part, it is dark yellowish brown clay loam, and in the lower part, it is dark brown clay. Fractured dolomitic bedrock is at a depth of 24 inches. The depth to fractured dolomitic bedrock commonly is about 30 inches. In some places, the surface layer is less than 10 inches thick. In places, the depth to bedrock is more than 40 inches.

Typically, the surface layer of the Dodgeville soil is dark brown silt loam about 10 inches thick. The subsoil is about 21 inches thick. In the upper part, it is brown silty clay loam, and in the lower part, it is reddish brown clay. Pale yellow dolomitic bedrock is at a depth of 31 inches. The depth to fractured dolomitic bedrock in some places is more than 40 inches or is less than 20 inches. In places, the surface layer is less than 10 inches thick.

Included in mapping are small areas of the deep Ashdale, Hitt, and Winnebago soils. Ashdale and Hitt soils are deeper to bedrock than Rockton and Dodgeville soils. Winnebago soils formed in clay loam glacial material and do not have bedrock within a depth of 60 inches. Winnebago soils are in positions on the landscape similar to those of Rockton and Dodgeville soils. These soils make up 5 to 15 percent of this map unit. Also included is a small area of Maquoketa shale south of Belvidere in the western half of sec. 14, T. 43 N., R. 3 E.

Permeability is moderate in the Rockton soil and moderately slow in the Dodgeville soil. Runoff in cultivated areas is medium to rapid. The available water capacity is low. The organic matter content is high in the Dodgeville soil and moderate in the Rockton soil. The shrink-swell potential in the subsoil is moderate in the upper part and high in the lower part. These soils are neutral to strongly acid.

In most areas, these soils are used for farming (fig. 8). They have fair potential for cultivated crops and fair to good potential for hay and pasture. They have poor potential for building site development and as sites for sanitary facilities.

These soils are suited to corn, soybeans, small grains, and grasses and legumes. The hazard of erosion and the low available water capacity are the major limitations to farming. These soils are somewhat droughty because of the low available water capacity and the loss of water as runoff. Maintaining an adequate vegetative cover and ground mulch helps to prevent the excessive loss of soil and helps to improve the moisture-supplying capacity by reducing runoff. Contour farming, the use of conservation tillage, and returning crop residue to the soil help to reduce the loss of soil due to erosion.

These soils are suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

Shrinking and swelling are a limitation to the use of these soils as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil, by placing the foundation in material that has low shrink-swell potential, or by extending the foundation to bedrock. Bedrock limits the depth of excavations for dwellings that have a basement. Low strength and frost action are limitations in using these soils for local roads and streets. These limitations can be overcome by replacing the base material. If these soils are used as septic tank absorption fields, the hazard of ground-water pollution is severe. Fractures in the bedrock allow effluent to pollute the underground water supply. The shallowness to bedrock is a severe limitation to storing effluent. A self-contained sewage treatment system or a hookup to a sanitary sewer would help to overcome this problem.

Capability subclass IIIe.

566D2—Rockton and Dodgeville soils, 9 to 15 percent slopes, eroded. This map unit consists of moderately deep, strongly sloping soils on side slopes of upland ridges. In most areas, this unit is dissected by

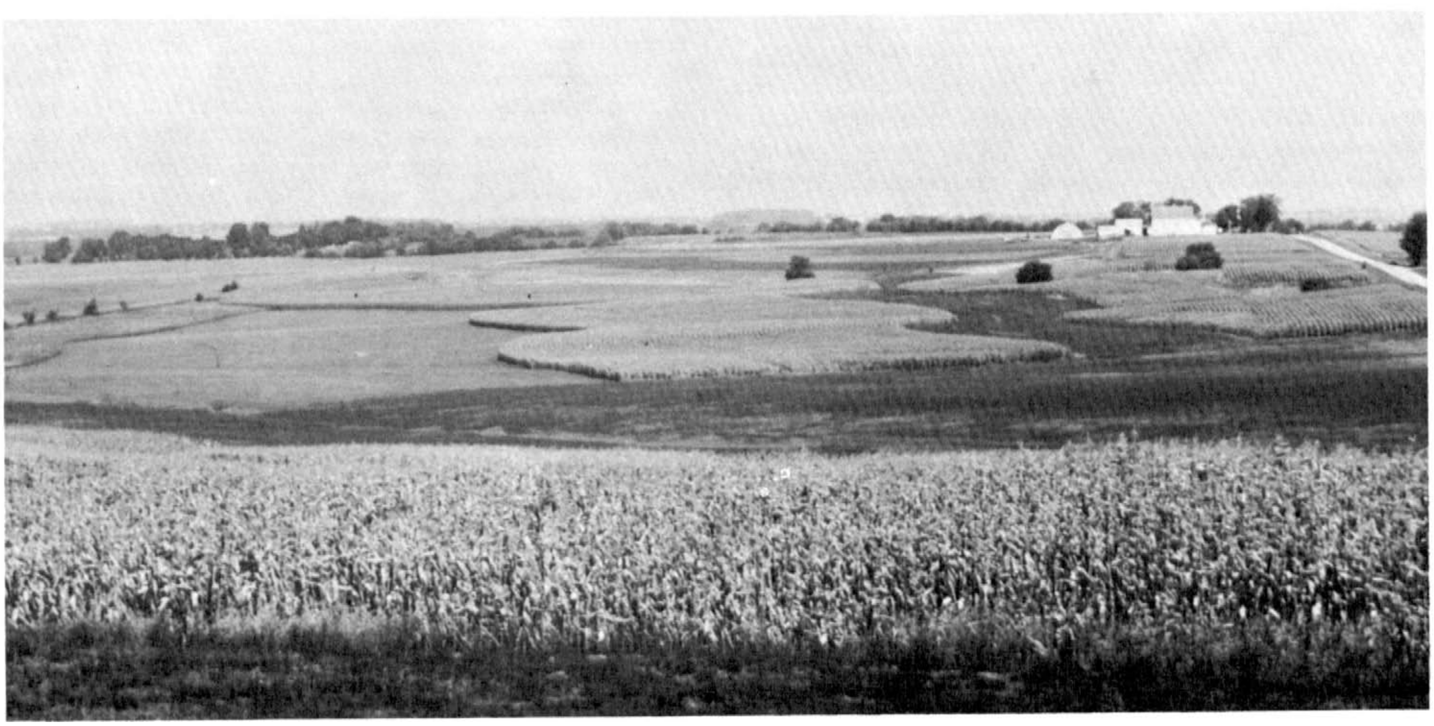


Figure 8.—Stripcropping in an area of sloping Rockton and Dodgeville soils.

shallow drainageways. The areas are irregular in shape and range from 2 to 40 acres in size. These soils are intermingled on the landscape but in an irregular pattern. In some areas, the soils could have been mapped separately, but there was no value in separating them. Individual areas consist of the Rockton soil, of the Dodgeville soil, or of both soils.

Typically, the surface layer of the Rockton soil is dark brown loam about 8 inches thick. The subsoil is about 14 inches thick. In the upper part, it is dark yellowish brown and brown loam and clay loam, and in the lower part, it is reddish brown clay. Pale yellow fractured dolomitic bedrock is at a depth of 22 inches. In places, the surface layer is less than 8 inches thick. In some places, the lower part of the subsoil is more than 6 inches thick.

Typically, the surface layer of the Dodgeville soil is dark brown silt loam about 8 inches thick. The subsoil is about 16 inches thick. In the upper part, it is brown silty clay loam, and in the lower part, it is reddish brown clay. Pale yellow dolomitic bedrock is at a depth of 24 inches. In places, the surface layer is less than 8 inches thick. In some places, the lower part of the subsoil is less than 10 inches thick. In places, the bedrock is at a depth of less than 20 inches, and in some places, it outcrops at the surface. These soils formed in glacial material and do not have bedrock within a depth of 60 inches. These soils make up about 5 to 15 percent of this map unit.

Permeability is moderate in the Rockton soil and moderately slow in the Dodgeville soil. Runoff in cultivated areas is rapid. The available water capacity is low. The organic matter content is high in the Dodgeville soil and moderate in the Rockton soil. The shrink-swell potential in the subsoil is moderate in the upper part and high in the lower part. These soils are neutral to strongly acid.

In most areas, these soils are used for farming. Some areas of residential development, near the city of Rockford, are in the unit. These soils have fair to poor potential for cultivated crops and fair potential for hay and pasture. They have poor potential for building site development and as sites for sanitary facilities.

These soils are better suited to grasses and legumes than to corn, soybeans, or small grains. The hazard of erosion, the strong slopes, and the low available water capacity are the major limitations to farming. These soils are somewhat droughty because of the low available water capacity and the loss of water as runoff. Maintaining an adequate vegetative cover and ground mulch helps to prevent the excessive loss of soil and helps to improve the moisture-supplying capacity by reducing runoff.

These soils are suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

These soils can be used for openland or woodland wildlife habitat. They are suited to woody and herbaceous plants. Wildlife habitat development can include trees and shrubs as well as grasses and legumes.

Shrinking and swelling are a limitation to the use of these soils as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil, by placing the foundation in material that has low shrink-swell potential, or by extending the foundation to bedrock. Bedrock limits the depth of excavations for dwellings that have a basement. Low strength and frost action are limitations in using these soils for local roads and streets. These limitations can be overcome by replacing the base material. If these soils are used as septic tank absorption fields, the hazard of ground-water pollution is severe. Fractures in the bedrock allow effluent to pollute the underground water supply. Bedrock and the steepness of slopes are limitations to storing effluent in these soils. A self-contained sewage treatment system or a hookup to a sanitary sewer can help to overcome these problems.

Capability subclass IVe.

570A—Martinsville silt loam, 0 to 2 percent slopes. This is a nearly level, well drained soil mainly on stream terraces. The areas are irregular in shape and range from 2 to several hundred acres in size.

Typically, the surface layer is dark grayish brown silt loam about 9 inches thick. The subsoil is 49 inches thick. In the upper part, it is brown and dark yellowish brown, friable loam; in the middle part, it is dark yellowish brown, friable clay loam and loam; and in the lower part, it is dark yellowish brown, very friable sandy loam. The substratum, to a depth of 64 inches, is dark yellowish brown loamy sand. In some places, the substratum is dark yellowish brown sand or sandy clay loam. In a few areas, the surface layer is thinner than is typical and is very dark grayish brown. In some areas, the subsoil formed partly in calcareous sand and gravel.

Included in mapping are small areas of somewhat poorly drained Kendall and Beardstown soils and poorly drained Selma soils. These soils are in shallow depressions and make up 2 to 4 percent of this map unit.

Permeability is moderate in the subsoil and moderately rapid in the substratum. Runoff in cultivated areas is slow. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to strongly acid. The available water capacity is moderate. The organic matter content is moderately low. The shrink-swell potential of the subsoil is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay, pasture, and

trees. It has fair to good potential for building site development and for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Using conservation tillage and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to improve fertility, to reduce crusting, and to increase water infiltration.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability class I.

570B—Martinsville silt loam, 2 to 5 percent slopes. This is a gently sloping, well drained soil on stream terraces and convex upland ridges. The areas are irregular in shape and range from 2 to 80 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsoil is about 45 inches thick. In the upper part, it is brown and dark yellowish brown, friable loam; in the middle part, it is dark yellowish brown, friable clay loam and loam; and in the lower part, it is dark yellowish brown, very friable sandy loam. The substratum, to a depth of 60 inches, is dark yellowish brown loamy sand and sand. In some places, the upper part of the subsoil has more silt than is typical. In a few areas, the substratum is dark yellowish brown, calcareous sandy loam. In some areas, the surface layer is thinner than is typical and is very dark grayish brown. In a few places, the subsoil formed in the underlying calcareous sand and gravel.

Included in mapping are small areas of somewhat poorly drained Kendall soils and poorly drained Selma and Drummer soils. These soils are in shallow depressions and drainageways and make up 2 to 6 percent of this map unit.

Permeability is moderate in the subsoil and moderately rapid in the substratum. Runoff in cultivated areas is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to strongly acid. The available water capacity is moderate. The organic matter content is moderately low. The shrink-swell potential of the subsoil is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay, pasture, and trees. It has fair to good potential for building site development and for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce the loss of soil due to erosion. Returning crop residue or adding other organic material to the soil helps to maintain fertility, to reduce crusting, and to increase water infiltration.

This soil is suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control the loss of soil due to erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IIe.

570C2—Martinsville silt loam, 5 to 9 percent slopes, eroded. This is a sloping, well drained soil on breaks of stream terraces or on convex upland side slopes. The areas are irregular in shape and range from 2 to 60 acres in size.

Typically, the surface layer is brown silt loam about 6 inches thick. The subsoil is about 40 inches thick. In the upper part, it is dark yellowish brown, friable clay loam, and in the lower part, it is dark yellowish brown, very friable sandy loam. The substratum, to a depth of 60 inches, is dark yellowish brown, stratified loamy sand and sand. In some places, the upper part of the subsoil has more silt than is typical. In a few areas, the substratum is dark yellowish brown, calcareous sandy loam. In a few places, the surface layer is thinner than is typical and is very dark grayish brown. In areas where material from the upper part of the subsoil has been mixed into the original surface layer by plowing, the present surface layer is brown loam or clay loam. In areas near gravelly kames, the subsoil developed in the underlying calcareous sand and gravel.

Included in mapping are small areas of somewhat poorly drained Kendall soils in drainageways. Kendall soils make up 2 to 4 percent of this map unit.

Permeability is moderate in the subsoil and moderately rapid in the substratum. Runoff in cultivated areas is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to strongly acid. The available water capacity is moderate. The organic matter content is moderately low. The

shrink-swell potential of the subsoil is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. However, the surface tends to crust, or the soil puddles after a hard rain, particularly in areas where subsoil material has been mixed into the plow layer.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay, pasture, and trees. It has fair to good potential for building site development and for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to maintain fertility, to reduce crusting, and to increase water infiltration.

This soil is suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil is well suited to use as woodland. In a few areas, it is in native hardwoods. Tree seedlings survive and grow well if competing vegetation is controlled or removed. The steepness of slopes is the only limitation to planting or harvesting trees.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IIIe.

728B—Winnebago silt loam, 2 to 5 percent slopes. This is a gently sloping, well drained soil on broad convex ridgetops and the upper part of slopes on uplands. Areas are irregular in shape and range from 2 to 160 acres in size.

Typically, the upper part of the surface layer is very dark grayish brown silt loam about 10 inches thick, and the lower part is dark brown silt loam about 5 inches thick. The subsoil extends to a depth of more than 60 inches. In the upper part, it is brown, friable loam; in the middle part, it is reddish brown and strong brown, firm clay loam; and in the lower part, it is reddish brown, friable sandy loam. In some places, the surface layer is loam or sandy loam. In a few places, the upper part of the subsoil is silty clay loam. In some places, the subsoil is shallower than is typical to sandy loam glacial till that is high in lime. In a few areas, the subsoil is underlain by sand. In places, bedrock is between depths of 40 and 60 inches. In some areas, slopes are less than 2 percent.

Included in mapping are small areas of moderately deep Rockton and Dodgeville soils. These soils are in positions on the landscape similar to those of this Winnebago soil, but they have fractured dolomitic bedrock between depths of 20 and 40 inches. These soils make up 2 to 5 percent of this map unit.

Permeability is moderate, and runoff is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to strongly acid. The available water capacity is high, and the organic matter content is moderate. The shrink-swell potential of the subsoil is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. However, the surface tends to crust, or the soil puddles after a hard rain.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for small grains, hay, and pasture. It has fair to good potential for building site development and for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. If this soil is used for cultivated crops, water erosion is a hazard. In areas where this soil has a sandy loam surface layer, it is slightly droughty, and soil blowing is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce the loss of soil due to erosion. Returning crop residue or adding other organic material to the soil helps to maintain fertility, to reduce crusting, and to increase water infiltration.

This soil is suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IIe.

728C2—Winnebago silt loam, 5 to 9 percent slopes, eroded. This is a sloping, well drained soil on side slopes on upland ridges. Areas are irregular in shape and range from 2 to 200 acres in size.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil extends to a depth of more than 60 inches. In the upper part, it is brown, friable loam; in the middle part, it is brown and strong brown, firm clay loam; and in the lower part, it is reddish brown, friable sandy loam. In some places, the surface layer is loam or sandy loam. In a few places, the upper part of the subsoil is silty clay loam. In some places, the subsoil is thinner than is typical, and the sandy loam glacial till is closer to the surface. In some areas, slopes are more than 9 percent. In some small areas, this soil is severely eroded.

Included in mapping are small areas of moderately deep Rockton and Dodgeville soils. Rockton and Dodgeville soils are in positions on the landscape similar to those of this Winnebago soil, but they have fractured dolomitic bedrock at a depth between 20 and 40 inches. These soils make up 10 to 15 percent of this map unit.

Permeability is moderate, and runoff is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to strongly acid. The available water capacity is high. The organic matter content is moderate. The shrink-swell potential of the subsoil is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. However, the surface tends to crust, or the soil puddles after a hard rain, particularly in areas where subsoil material has been mixed into the plow layer.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for small grains, hay, and pasture. It has fair to good potential for building site development and for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Erosion is a hazard. Contour farming, the use of terraces or conservation tillage, and returning crop residue to the soil help to reduce erosion. In areas where the surface layer is sandy loam, this soil is slightly droughty, and soil blowing is a hazard. Returning crop residue or adding other organic material to the soil helps to maintain fertility, to reduce crusting, and to increase water infiltration.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. This soil is well suited to use as septic tank absorption fields. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing. Establishing lawns is difficult in areas where the surface layer is sandy loam. In these areas, mulch seedings and frequent applications of water may be needed.

Capability subclass IIIe.

728D2—Winnebago silt loam, 9 to 15 percent slopes, eroded. This is a strongly sloping, well drained soil on the lower part of side slopes on upland ridges. Areas are irregular in shape and range from 2 to 60 acres in size.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsoil extends to a depth of 60 inches. In the upper part, it is brown, friable loam; in the middle part, it is brown and strong brown, firm clay loam; and in the lower part, it is reddish brown, friable sandy loam. In a few places, the surface layer is loam or clay loam. In some places, the subsoil is thinner than is typical, and the sandy loam glacial till is closer to the surface. In some small areas, this soil is severely eroded.

Included in mapping are small areas of Rockton and Dodgeville soils. Rockton and Dodgeville soils are in positions on the landscape similar to those of this Winnebago soil, but they have fractured dolomitic bedrock at a depth between 20 and 40 inches. These soils make up 5 to 10 percent of this map unit.

Permeability is moderate, and runoff is rapid. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to strongly acid. The available water capacity is high, and the organic matter content is moderate. The shrink-swell potential of the subsoil is moderate. The steepness of the slopes makes tillage difficult, and water erosion is a severe hazard.

In most areas, this soil is used for farming. It has poor to fair potential for cultivated crops and small grains. It has good potential for hay and pasture. It has fair potential for recreation uses. It has fair potential for building site development and for use as septic tank absorption fields.

If this soil is used for cultivated crops, water erosion is a hazard. Contour farming, the use of terraces and conservation tillage, and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to maintain fertility, to reduce crusting, and to increase water infiltration.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely

deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil has fair potential for use as camping and picnic areas, and it has good potential for paths and trails. Slope is the main limitation. This soil has poor potential for use as playgrounds. Establishing playgrounds in the small, less sloping areas can help to overcome the limitation of slope. To control the loss of soil due to water erosion and soil blowing, heavily used areas need to be protected, recreation land needs to be graded and shaped, plants need to be established in some critical areas, and in places, the slopes need to be stabilized.

This soil is well suited to use as habitat for openland or woodland wildlife. It has good potential for such habitat elements as grasses and legumes and wild herbaceous upland plants. These elements provide food and cover for birds and mammals that use openland as habitat. This soil also has good potential for the elements of woodland wildlife habitat, such as coniferous woody plants and hardwoods, that provide food and cover for woodland wildlife.

Shrinking and swelling are a limitation to the use of the soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Slopes need to be smoothed if this soil is used for building sites. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. Septic tank absorption field lines need to be designed and placed on the contour to provide for an even distribution of effluent. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing.

Capability subclass IVe.

768B—Backbone loamy sand, 2 to 5 percent slopes. This is a gently sloping, moderately deep, well drained soil on long, narrow convex ridgetops or on the upper part of side slopes. The areas are irregular in shape and range from 3 to 60 acres in size.

Typically, the surface layer is very dark grayish brown, friable loamy sand about 8 inches thick. The subsurface layer is brown, friable loamy sand about 3 inches thick. The subsoil is about 20 inches thick. In the upper part, it is brown, friable sandy loam, and in the lower part, it is reddish brown, friable loam. Light yellowish brown dolomite bedrock is at a depth of 21 inches. The dolomite commonly is fractured or shattered in the upper part and becomes more consolidated with depth. In places, the subsoil is thinner than is typical, and dolomite bedrock is closer to the surface. In some areas, the subsoil is deeper to dolomite bedrock than is typical. In a few places, the lower part of the subsoil is brown or reddish brown, firm silty clay.

Permeability is moderately rapid in the upper part of this soil, and it is moderate in the lower part. Runoff in cultivated areas is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to medium acid. The available water capacity is low. The organic matter content is moderately low. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content. The root zone is restricted by fractured dolomite bedrock below a depth of about 25 inches.

In most areas, this soil is used for farming. It has fair potential for cultivated crops and for hay and pasture. It has fair to poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. The nutrient-supplying capacity of this soil is low. Using field windbreaks and conservation tillage and returning crop residue to the soil help to reduce the loss of soil due to erosion. Returning crop residue or adding other organic material to the soil helps to maintain fertility and to reduce soil blowing.

This soil is suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil is moderately suited to use as woodland. In a few areas, it is in hardwoods. Tree seedlings survive and grow well if competing vegetation is controlled or removed. Droughtiness and shallowness to bedrock are the only limitations to planting or harvesting trees.

The shallowness to bedrock limits the depth of excavations for dwellings that have a basement. Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil, by placing the foundation in material that has low shrink-swell potential, or by extending the foundation to bedrock. The shallowness to bedrock is a limitation in using this soil for local roads and streets. This limitation can be overcome by adding base material. To use this soil as a site for septic tank absorption fields, this soil needs to be altered to provide an adequate absorption area and to eliminate the hazard of ground-water contamination caused by the shallowness to bedrock. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing. If this soil is used as a site for sewage lagoons, an impervious layer needs to be placed above the bedrock.

Capability subclass IVs.

768C—Backbone loamy sand, 5 to 9 percent slopes. This is a sloping, moderately deep, well drained soil. It is in narrow bands along convex side slopes. The

areas are irregular in shape and range from 2 to 60 acres in size.

Typically, the surface layer is very dark grayish brown, friable loamy sand about 8 inches thick. The subsurface layer is brown, friable loamy sand about 3 inches thick. The subsoil is about 14 inches thick. In the upper part, it is brown, friable sandy loam, and in the lower part, it is reddish brown, friable loam or clay loam. Light yellowish brown dolomite bedrock is at a depth of 25 inches. It is commonly fractured or shattered in the upper part and becomes more consolidated with depth. In some places, the subsoil is shallower to dolomite bedrock than is typical, and in other places it is deeper. In a few places, the lower part of the subsoil is brown or reddish brown, firm silty clay. In some areas, there is no subsurface layer.

Permeability is moderately rapid in the upper part of this soil and moderate in the lower part. Runoff in cultivated areas is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to medium acid. The available water capacity is low. The organic matter content is moderately low. The surface layer is friable and can be tilled easily within a wide range in moisture content. The root zone is restricted by fractured dolomite bedrock below a depth of about 25 inches.

In most areas, this soil is used as woodland or cropland. It has fair potential for cultivated crops and for hay and pasture. It has fair to poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, small grains, and grasses and legumes. The nutrient-supplying capacity of this soil is low. Using field windbreaks and conservation tillage and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to maintain fertility and to reduce soil blowing.

This soil is suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil is moderately suited to use as woodland. In many areas, it is in hardwoods. In a few areas, pines have been planted. Tree seedlings survive and grow well if competing vegetation is controlled or removed. Droughtiness and shallowness to bedrock are the only limitations to planting or harvesting trees.

The shallowness to bedrock limits the depth of excavations for dwellings that have a basement. Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil, by placing the foundation in material that has low shrink-swell potential, or by extending the foundation to bedrock. The shallowness to bedrock is a limitation in using this soil for local roads and streets. This limitation can be overcome by adding base material. If this soil is used as a site for septic tank absorption fields, it needs to be altered to provide an adequate absorption area and to eliminate the hazard of ground-water contamination caused by the shallowness to bedrock. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing. If this soil is used as a site for sewage lagoons, an impervious layer needs to be placed above the bedrock.

Capability subclass IVs.

768D—Backbone loamy sand, 9 to 15 percent slopes. This is a strongly sloping, moderately deep, well drained soil on uneven convex side slopes. The areas are irregular in shape and range from 2 to 20 acres in size.

Typically, the surface layer is very dark grayish brown, friable loamy sand about 7 inches thick. The subsurface layer is brown or dark grayish brown, friable loamy sand about 2 inches thick. The subsoil is about 14 inches thick. In the upper part, it is brown, friable sandy loam, and in the lower part, it is reddish brown, friable loam or clay loam. Light yellowish brown dolomite bedrock is at a depth of 23 inches. It commonly is fractured or shattered in the upper part and becomes more consolidated with depth. In areas where this soil is along drainageways, the subsoil is shallower to the dolomite bedrock than is typical. In some areas, the subsoil is deeper to bedrock. In areas where material from the upper part of the subsoil has been mixed into the original surface layer by plowing, the present surface layer is mixed brown and very dark grayish brown loamy sand. In some areas, there is no subsurface layer.

Permeability is moderately rapid in the upper part of this soil and moderate in the lower part. Runoff in cultivated areas is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to strongly acid. The available water capacity is low. The organic matter content is moderately low. The surface layer is friable and can be tilled easily within a wide range in moisture content. The root zone is restricted by fractured dolomite bedrock below a depth of about 25 inches.

In most areas, this soil is used as woodland or pastureland. It has fair potential for hay and pasture and good potential for trees. It has fair to poor potential for building site development and as sites for sanitary facilities.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil is well suited to use as woodland. In many areas, it is in hardwoods. In a few areas, pines have

been planted. Tree seedlings survive and grow well if competing vegetation is controlled or removed. Droughtiness, steepness of slopes, and shallowness to bedrock are limitations to planting or harvesting trees.

This soil can be used as habitat for openland or woodland wildlife. It is suited to woody and herbaceous plants. Wildlife habitat development can include trees and shrubs as well as grasses and legumes.

The shallowness to bedrock limits the depth of excavations for dwellings that have a basement. This soil can be used for building site development by extending the foundation to bedrock or by smoothing the slopes. Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing the foundation to withstand the shrinking and swelling of the soil or by placing the foundation in material that has a low shrink-swell potential. The shallowness to bedrock is a limitation in using this soil as a site for local roads and streets. This limitation can be overcome by adding base material. If this soil is used as a site for septic tank absorption fields, this soil needs to be altered to provide an adequate absorption area and to eliminate the hazard of ground-water contamination caused by the shallowness to bedrock, and the slopes need to be smoothed. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing. If this soil is used as a site for sewage lagoons, an impervious layer needs to be placed above the bedrock.

Capability subclass VIs.

769B—Edmund silt loam, 2 to 5 percent slopes. This is a gently sloping, shallow, well drained soil on upland ridges and side slopes. The areas are irregular in shape and range from 2 to 20 acres in size.

Typically, the surface layer is very dark gray silt loam about 7 inches thick. The subsoil is about 8 inches thick. In the upper part, it is very dark grayish brown, friable silty clay loam, and in the lower part, it is dark brown, firm heavy silty clay loam. Pale yellow and yellow dolomitic limestone bedrock is at a depth of 15 inches. It is fractured in the upper part and becomes more consolidated with depth. In some places, the subsoil is thicker than is typical. In places, the lower part of the subsoil is reddish brown clay. In some areas, the surface layer is loam, and in other areas, it is light colored.

Included in mapping are small areas of the moderately deep Rockton and Dodgeville soils. These soils are in positions on the landscape similar to those of this Edmund soil. They make up 2 to 5 percent of this map unit.

Permeability is moderately slow in the lower part of the subsoil. Runoff is medium to rapid. The subsoil is medium acid to mildly alkaline. The available water capacity is low. The organic matter content is moderate. The shrink-swell potential is high in the lower part of the subsoil. This soil is droughty, and productivity is low. In places, tillage is difficult because of the shallowness to bedrock. The root zone is restricted by the bedrock below a depth of 20 inches.

In most areas, this soil is used for farming. It has fair potential for cultivated crops and for hay and pasture. It has poor potential for building site development and as sites for sanitary facilities. It has fair potential for most recreation use.

This soil is suited to small grains. The bedrock restricts root growth for corn and alfalfa. Droughtiness is a limitation to cultivated crops. If this soil is used for cultivated crops, using field windbreaks and conservation tillage and returning crop residue to the soil help to reduce the loss of soil due to erosion.

This soil is suitable for use as pastureland and hayland. However, overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil can be used as camp areas and picnic areas. The surface compacts easily in areas of heavy use. This soil is not well suited to use as playgrounds because it compacts easily and is muddy and slippery when wet.

This soil is well suited to development of a grassy or herbaceous cover for openland wildlife. It has only fair suitability for a tree or shrub cover because the shallowness to bedrock severely limits the number of adapted species.

The shallowness to bedrock limits the depth of excavations for dwellings that have a basement. Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil, by placing the foundation in material that has a low shrink-swell potential, or by extending the foundation to bedrock. The hazard of frost action is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. To use this soil as a site for septic tank absorption fields, the soil needs to be altered to provide an adequate absorption area and to eliminate the hazard of ground-water contamination caused by the shallowness to bedrock. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing. If this soil is used as a site for sewage lagoons, an impervious layer needs to be placed above the bedrock.

Capability subclass IIe.

769C—Edmund silt loam, 5 to 9 percent slopes. This is a sloping, shallow, well drained soil on upland side slopes and shoulder slopes. The areas are irregular in shape and range from 2 to 15 acres in size.

Typically, the surface layer is very dark gray silt loam about 7 inches thick. The subsoil is about 8 inches thick. In the upper part, it is very dark grayish brown, friable silty clay loam, and in the lower part, it is dark brown,

firm, heavy silty clay loam. Pale yellow or yellow dolomitic limestone bedrock is at a depth of 15 inches. It is fractured in the upper part and becomes more consolidated with depth. In some places, the subsoil is thinner than is typical. In places, limestone flags are at the surface. In places, the surface layer is loam.

Included in mapping are small areas of the moderately deep Rockton and Dodgeville soils. These soils are in positions on the landscape similar to those of this Edmund soil. They make up 2 to 5 percent of this map unit.

Permeability is moderately slow in the lower part of the subsoil. Runoff is medium to rapid. The subsoil is medium acid to mildly alkaline. The available water capacity is low. The organic matter content is moderate. The shrink-swell potential is high in the lower part of the subsoil. This soil is droughty, and productivity is low. In places, tillage is difficult because of the outcrops of bedrock. The root zone is restricted by the bedrock below a depth of 20 inches.

In most areas, this soil is used for farming. It has fair potential for cultivated crops and for hay and pasture. It has poor potential for building site development and as sites for sanitary facilities. It has fair potential for most recreation uses.

The bedrock restricts the root growth for corn and alfalfa, and droughtiness is a limitation. If this soil is used for cultivated crops, erosion can cause further damage. Contour farming, the use of conservation tillage, and returning crop residue to the soil help to reduce the loss of soil due to erosion. The numerous outcrops of bedrock make tillage difficult.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil can be used as camp areas and picnic areas; however, the surface compacts easily and is muddy and slippery when wet.

This soil is well suited to the development of a grassy or herbaceous cover for openland wildlife. It has only fair suitability for a tree or shrub cover because the shallowness to bedrock severely limits the number of adapted species.

The shallowness to bedrock limits the depth of excavations for dwellings that have a basement. Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil, by placing the foundation in material that has low shrink-swell potential, or by extending the foundation to bedrock. The hazard of frost action is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. To use this soil as a site for septic tank absorption fields, it needs to be altered to provide an adequate absorption area and to eliminate the hazard of ground-water contamination caused by the shallowness to bedrock. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing. If this soil is used as a site for sewage lagoons, an impervious layer needs to be placed above the bedrock.

Capability subclass IIIe.

769D2—Edmund silt loam, 9 to 15 percent slopes, eroded. This is a sloping, shallow, well drained soil on upland side slopes along drainageways. The areas are linear in shape and range from 5 to 60 acres in size.

Typically, the surface layer is very dark gray silt loam about 5 inches thick. The subsoil is about 6 inches thick. In the upper part, it is very dark grayish brown, friable silty clay loam, and in the lower part, it is dark brown, firm, heavy silty clay loam. Pale yellow or yellow dolomitic limestone bedrock is at a depth of 11 inches. It is fractured in the upper part and becomes more consolidated with depth. In some places, the subsoil is thinner than is typical. In places, numerous limestone flags are at the surface. In places, the surface layer is loam.

Included in mapping are small areas of the moderately deep Rockton and Dodgeville soils. These soils are in positions on the landscape similar to those of this Edmund soil. They make up 2 to 5 percent of this map unit.

Permeability is moderately slow in the lower part of the subsoil. Runoff in cultivated areas is rapid. The subsoil is medium acid to mildly alkaline. The available water capacity is low. The organic matter content is moderate. The shrink-swell potential is high in the lower part of the subsoil. This soil is droughty, and productivity is low. In places, tillage is difficult because of the outcrops of bedrock. The root zone is restricted by the bedrock below a depth of 20 inches.

In most areas, this soil is used for farming. It has poor potential for cultivated crops and fair potential for hay and pasture. It has poor potential for building site development and as sites for sanitary facilities. It has fair potential for recreation uses.

This soil is not suited to corn or soybeans. If it is used for corn and soybeans, erosion can cause severe damage.

This soil is suited to use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil can be used as camp areas. The surface compacts easily in areas of heavy use. This soil is not suitable for use as playgrounds because it is too steep and is muddy and slippery when wet.

This soil is well suited to the development of a grassy or herbaceous cover for openland wildlife. It is fairly suited to a tree or shrub cover because the shallowness to bedrock severely limits the number of adapted species.

The shallowness to bedrock limits the depth of excavations for dwellings that have a basement. Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil, by placing the foundation in material that has low shrink-swell potential, or by extending the foundation to bedrock. The hazard of frost action is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. To use this soil as a site for septic tank absorption fields, the soil needs to be altered to provide an adequate absorption area and to eliminate the hazard of ground-water contamination caused by the shallowness to bedrock. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing. If this soil is used as a site for sewage lagoons, an impervious layer needs to be placed above the bedrock.

Capability subclass IVe.

771—Hayfield loam. This is a nearly level, somewhat poorly drained soil on stream terraces. Areas are irregular in shape and range from 3 to about 80 acres in size.

Typically, the surface layer is black, friable loam about 8 inches thick. The subsurface layer is dark grayish brown loam about 6 inches thick. The subsoil is brown, friable heavy loam about 10 inches thick. The substratum extends to a depth of 60 inches or more. In the upper part, it is mixed grayish brown and yellowish brown sand, and in the lower part, it is mixed dark gray and dark grayish brown loamy sand and sand. In some places, there is no subsurface layer, and in other places the subsurface layer has been mixed with the surface layer by plowing. In some areas, the surface layer is lighter in color. In some small areas, the subsoil is thicker than is typical.

Included in mapping are small areas of poorly drained Marshan soils. These soils are in depressions or in slightly lower positions on the landscape. They make up 2 to 5 percent of this map unit.

Permeability is moderate in the subsoil and rapid in the substratum. Runoff in cultivated areas is slow. The surface layer varies widely in reaction because of local liming practices. The subsoil is slightly acid to mildly alkaline. The available water capacity is low, and the organic matter content is moderate. The surface layer is friable and can be worked easily within a wide range in moisture content. The seasonal water table is within a depth of about 3 feet.

In most areas, this soil is used for farming. It has fair potential for cultivated crops and for hay and pasture. It has good to fair potential for building site development and poor potential as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. The use of conservation tillage and returning crop residue to the soil help to reduce the loss of soil due to erosion. Returning crop residue or adding other organic material to the soil improves tilth and makes seedbed preparation easier. Although this soil is somewhat poorly drained, artificial drainage generally is not needed. This soil is slightly droughty in dry periods.

This soil is suitable for use as pastureland or hayland. However, overgrazing or grazing when the soil is too wet reduces the production of forage and causes surface compaction, excessive runoff, and poor tilth. Plantings for pasture and hay, proper stocking rates, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition.

The seasonal water table limits the use of this soil as a site for dwellings that have a basement. A drainage system needs to be installed to help overcome this limitation. The hazard of frost action is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. A septic tank absorption field will not function properly on this soil unless the seasonal water table is lowered or the absorption field is placed in a seepage bed above the water table. There is a hazard of ground water contamination because of seepage. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IIs.

772—Marshan loam. This is a nearly level, poorly drained soil on low stream terraces and in old stream channels. The areas are irregular in shape and range from 2 to several hundred acres in size. In some places, this soil is subject to flooding for very brief periods from March through November.

Typically, the upper part of the surface layer is black loam about 7 inches thick, and the lower part is very dark brown, very dark gray, and grayish brown loam about 10 inches thick. The subsoil is about 7 inches thick. In the upper part, it is olive gray and yellowish brown, friable loam, and in the lower part, it is olive gray, friable loam that has dark gray and olive mottles. The substratum, to a depth of about 60 inches, is pale olive and brownish yellow coarse sand. In some places, the subsoil is deeper to sand than is typical. In some areas, the clay content in the subsoil is significantly higher than that in the surface layer. In a few areas, the subsoil has more sand than is typical.

Included in mapping are small areas of somewhat poorly drained Hayfield and La Hogue soils and well drained Jasper soils. These soils are on slight rises or mounds and make up 2 to 7 percent of this map unit.

Permeability is moderate in the subsoil and rapid in the substratum. Runoff in cultivated areas is slow. The surface layer varies widely in reaction because of local liming practices. The subsoil is neutral to slightly acid. The available water capacity is moderate. The organic matter content is high. The shrink-swell potential is moderate in the subsoil. The surface layer is friable and is easy to till; however, the surface tends to crust or the soil puddles after a hard rain, particularly in areas where this soil has been worked when it was too wet.

In most areas, this soil is used for farming. It has fair potential for cultivated crops and for hay and pasture. It has fair potential as habitat for wetland wildlife and poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Tile drainage is needed if this soil is used for cultivated crops. However, in some areas, suitable outlets are difficult to locate. Ponding in wet periods is a hazard to crops; however, if the water table is lowered, this soil can become slightly droughty.

This soil has good potential for the development of habitat for openland and wetland wildlife. It is suited to grass and seed crops, grasses, and wild herbaceous plants. Shallow-water areas can be developed easily.

The seasonal water table limits the use of this soil as a site for dwellings with or without a basement. A drainage system needs to be installed to help overcome this limitation. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. A septic tank absorption field will not function properly on this soil unless the seasonal water table is lowered or the absorption field is placed in a seepage bed above the water table. There is a hazard of ground water contamination because of seepage. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IIw.

776—Comfrey loam. This is a nearly level or depressional, poorly drained soil in alluvial areas throughout the survey area. Areas generally are linear in shape and range from 2 to several hundred acres in size. This soil is subject to common flooding for brief to long periods in spring.

Typically, the upper part of the surface layer is black loam about 6 inches thick, and the lower part is black and very dark gray clay loam about 20 inches thick. The substratum, to a depth of 60 inches, is grayish brown and gray loam, sandy loam, and loamy fine sand. In most places, the substratum is stratified. In some places, the surface layer is more than 36 inches thick. In other places, it is light colored. In some places, the depth to the seasonal water table is 1 to 3 feet. In places, there is less sand in the profile than is typical.

Included in mapping are small areas of the very poorly drained, organic Adrian, Houghton, and Palms soils and the well drained Troxel soils. These soils make up 10 to 15 percent of this map unit.

Permeability is moderate in the subsoil and moderate to moderately rapid in the substratum. Runoff in cultivated areas is slow. The available water capacity and the organic matter content are high. The seasonal water table is at or near the surface. The soil is slightly acid to mildly alkaline. The shrink-swell potential is moderate. The surface layer generally is friable and can be tilled easily within a fairly wide range in moisture content.

In most areas, this soil is used for farming. It has fair to good potential for cultivated crops and for hay and pasture. It has poor potential for most recreation uses, for building site development, and as sites for sanitary facilities. It has good potential for use as habitat for wetland wildlife.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. If this soil is used for cultivated crops, artificial drainage is needed to obtain a maximum yield. If suitable outlets are available, tile drainage and surface ditches are effective. A levee or dike system can help to protect some areas from overflow.

This soil is suitable for use as pastureland or hayland. However, overgrazing or grazing when the soil is too wet reduces the production of forage and causes surface compaction, excessive runoff, and poor tilth. Plantings for pasture and hay, proper stocking rates, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition.

This soil has good potential for the development or preservation of habitat for wetland wildlife. The native plants provide good food and cover for wetland wildlife, including ducks, muskrats, mink, and shore birds. Openwater areas can easily be developed.

The seasonal water table limits the use of this soil as a site for dwellings with or without a basement. A drainage system needs to be installed to help overcome this limitation. This soil needs to be protected from flooding. To overcome the hazards of the seasonal high water table and flooding, the base material needs to be replaced with a built-up grade. Onsite sewage disposal systems function poorly or fail completely because of the seasonal high water table and the occasional flooding.

Capability subclass IIw.

777—Adrian muck. This is a nearly level or depressional, very poorly drained organic soil on uplands, outwash plains, and flood plains adjacent to all the major streams and to many minor streams in the survey area. Areas are irregular in shape and generally are less than 10 acres in size. Frost-mound features can be seen in the undrained, uncultivated areas of this soil. This soil is subject to frequent flooding for long periods in winter and early in spring.

Typically, black muck extends to a depth of about 25 inches. The next layer is very dark grayish brown mucky peat about 7 inches thick. The substratum, to a depth of 60 inches, is grayish brown, calcareous loamy sand. In some places, the black organic material extends to a depth of 60 inches. In places, this substratum is silt loam or loam.

Included in mapping are small areas of poorly drained Comfrey loam on level flood plains and old oxbows. Comfrey loam is a mineral soil. It makes up 2 to 15 percent of this map unit.

Permeability is moderately rapid in the upper part of this soil and rapid in the lower part. Runoff in cultivated areas is very slow. The water table is high most of the year. If Adrian muck is drained, decomposition is accelerated, and some subsidence occurs. The available moisture capacity and the organic matter content are very high. The soil is slightly acid to neutral.

In most areas, this soil has been drained for cultivation. Adrian muck has good potential for specialty crops and for common row crops. It has poor potential for use as pasture and woodland. It has poor potential for building site development and as sites for sanitary facilities. It has good potential for the development of habitat for wetland wildlife.

This soil is well suited to specialty crops, including potatoes, onions, and bulbous floral plants. Artificial drainage is needed if this soil is used for farming. After drainage, there is gradual subsidence. Subsidence can be minimized by flooding the areas when the soil is not being cropped and by providing protection from soil blowing.

This soil has good potential for use as habitat for wetland wildlife. The native plants provide good food and cover for wetland wildlife, including ducks, muskrats, mink, and shore birds. Open water areas can easily be developed.

This soil is not suited to building site development. The water table is high, and this soil is subject to flooding. This soil has very poor bearing strength to a depth of 3 or 4 feet because of the high organic matter content. If this soil is drained, subsidence occurs because of the accelerated decomposition of the organic material.

Capability subclass IVw.

779B—Chelsea loamy fine sand, 2 to 7 percent slopes. This is a gently sloping, excessively drained soil on broad stream terraces and undulating uplands. Areas are crescent-shaped or are irregular in shape and range from 2 to 60 acres in size.

Typically, the surface layer is very dark grayish brown loamy fine sand about 4 inches thick. The subsurface layer is brown loamy sand and yellowish brown loamy fine sand about 31 inches thick. The subsoil, to a depth of 60 inches, is yellowish brown sand and has thin layers of brown sandy loam and loamy sand. In some places, the surface layer and subsoil are sandy loam. In places, gravel is at a depth of less than 60 inches. In a few places, the surface layer is darker than is typical.

Included in mapping are small areas of a moderately deep, somewhat excessively drained Backbone soil. This soil has bedrock at a depth between 20 and 40 inches. It makes up 5 to 10 percent of this map unit.

Permeability is rapid, and runoff is medium. The surface layer varies widely in reaction because of local liming practices. The subsurface layer and the layers below that are slightly acid to strongly acid. Natural fertility and the organic matter content are low. The available water capacity is low.

In most areas, this soil is used as woodland; in some areas, it is used for crops. It has poor potential for cultivated crops. It has good potential for Christmas trees and fair potential for openland wildlife habitat. It has fair potential for hay and pasture. Where seepiness is not excessive, this soil has fair to good potential for building site development and for use as septic tank absorption fields.

Using this soil for Christmas trees helps to control soil blowing and to conserve soil moisture. In a few small areas, this soil is in native hardwoods. Seedling mortality is high because of droughtiness. This can be partly overcome if competing vegetation is controlled or removed.

This soil is suitable for openland or woodland wildlife habitat if the native plant cover is maintained. Droughtiness and low fertility are limitations to developing a grass-legume cover or a wildlife food plot. This soil can provide suitable cover for openland and woodland wildlife.

Using this soil as hayland and pastureland helps to control water erosion and soil blowing. However, overgrazing causes poor vegetative growth and increases plant mortality. Proper stocking rates, pasture rotation, weed control, fertilization, and timely deferment of grazing help to keep pasture and soil in good condition.

This soil has slight limitations if used as a site for dwellings. The slope needs to be smoothed if the soil is used as a site for small commercial buildings. This soil has sufficient strength and stability to support vehicular traffic. Ground-water pollution is a hazard if this soil is used as septic tank absorption fields. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IVs.

779C—Chelsea loamy fine sand, 7 to 12 percent slopes. This is a sloping, excessively drained soil on low hummocky dunes on broad high terraces and on rolling uplands. Areas are crescent-shaped or are irregular in shape and range from 2 to 40 acres in size.

Typically, the surface layer is very dark grayish brown loamy sand about 3 inches thick. The subsurface layer is brown and yellowish brown loamy fine sand about 31 inches thick. The subsoil, to a depth of 60 inches, is yellowish brown sand and has thin layers of brown loamy

sand or sandy loam. In some places, gravel is at a depth of less than 60 inches. In a few places, the surface layer is darker than is typical. In a few areas, some short slopes are more than 12 percent.

Included in mapping are small areas of a moderately deep, excessively drained Backbone soil. This soil has bedrock at a depth between 20 and 40 inches. This soil makes up 5 to 10 percent of this map unit.

Permeability is rapid, and runoff is medium. The surface layer varies widely in reaction because of local liming practices. The subsurface layer and the layers below that are medium acid to strongly acid. Natural fertility and the organic matter content are low. The available water capacity is low.

In most areas, this soil is used as woodland. It has poor potential for cultivated crops. It has good potential for Christmas trees and fair potential for the development of habitat for openland and woodland wildlife. It has good potential for use as forest preserves, conservation areas, and natural areas. It has fair to poor potential for building site development and as sites for sanitary facilities.

This soil is not suited to cultivated crops. Droughtiness, low fertility, and excessive slope limit crop growth.

Using this soil for Christmas trees helps to control soil blowing and to conserve soil moisture. In a few small areas, this soil is in hardwoods. Seedling mortality is high because of droughtiness; this can be partly overcome if competing vegetation is controlled or removed.

If the native plant cover is maintained, this soil is fairly suited to use as habitat for openland or woodland wildlife. Droughtiness and low fertility are limitations to developing a grass-legume cover or a wildlife food plot. If adapted species are planted, this soil can provide suitable cover for openland and woodland wildlife.

In a few relatively undisturbed areas, the natural environment is distinctive; it can be preserved by excluding livestock from these areas and by controlling public use. These natural areas have educational, scientific, and recreational value.

The slopes need to be smoothed if this soil is used for building site development. Septic tank absorption field lines need to be placed on the contour to provide an even distribution of effluent. Ground-water contamination is a possible hazard. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass VIs.

780B—Grellton sandy loam, 1 to 5 percent slopes. This is a gently sloping, well drained soil on stream terraces and on upland ridgetops. Areas are crescent-shaped or are irregular in shape and range from 2 to 60 acres in size.

Typically, the surface layer is very dark brown sandy loam about 7 inches thick. The subsurface layer is dark grayish brown fine sandy loam about 4 inches thick. The subsoil is about 25 inches thick. In the upper part, it is brown very fine sandy loam; in the middle part, it is brown silt loam; and in the lower part, it is yellowish-brown silt loam. The substratum, to a depth of about 60 inches, is mixed yellowish brown and dark grayish brown silt loam. In some places, the surface layer is darker than is typical. In some areas, the underlying material is silt that is high in lime. In a few areas, the seasonal water table is at a depth between 3 and 6 feet.

Included in mapping are small areas of well drained Billett and Fayette soils. The Billett soils are sandy throughout and are in areas similar to those of the Grellton soil. Fayette soils are silty throughout. These soils make up 10 to 15 percent of this map unit.

Permeability is moderate, and runoff is slow. The surface layer varies widely in reaction because of local liming practices. The subsoil is medium acid to mildly alkaline. The available water capacity is high, and the organic matter content is low. The shrink-swell potential in the lower part of the subsoil is moderate. The surface layer is friable and can be tilled easily. This soil is subject to water erosion and soil blowing.

In most areas, this soil is used for farming. It has fair potential for cultivated crops and for small grains, hay, and pasture. It has good potential for trees and for the development of wildlife habitat. This soil has fair potential for building site development and as sites for sanitary facilities.

If this soil is used for cultivated crops, soil blowing is a hazard. Although the available water capacity is high, in the upper 2 feet this soil tends to dry out rapidly and is slightly droughty. Using field windbreaks and conservation tillage and returning crop residue to the soil help to reduce soil blowing.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil can be used for openland or woodland wildlife habitat. It is suited to woody and herbaceous plants. Wildlife habitat development can include trees and shrubs as well as grasses and legumes.

Shrinking and swelling limit the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to accommodate the slow movement of effluent. Slope is a limitation for sewage lagoons. This limitation can be

overcome by smoothing. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IIe.

780C2—Grellton sandy loam, 5 to 9 percent slopes, eroded. This is a sloping, well drained soil on high terraces along major streams and on upland ridgetops. Areas are crescent-shaped or are irregular in shape and range from 2 to 100 acres in size.

Typically, the surface layer is dark grayish brown sandy loam about 10 inches thick. The subsoil is about 24 inches thick. In the upper part, it is brown sandy loam; in the middle part, it is brown silt loam; and in the lower part, it is yellowish brown silt loam. The substratum, to a depth of 60 inches, is mixed yellowish brown and dark grayish brown silt loam. In some places, the surface layer is loamy sand. In some areas, the underlying material is silt that is high in lime. In some areas, the soil is severely eroded.

Included in mapping are small areas of well drained Billett and Fayette soils. These soils are in areas similar to those of this Grellton soil. Billett soils are sandy throughout, and Fayette soils are silty throughout. These soils make up 10 to 15 percent of this map unit.

Permeability is moderate, and runoff is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is medium acid to mildly alkaline. The available water capacity is high. The organic matter content is low. The shrink-swell potential in the lower part of the subsoil is moderate.

In most areas, this soil is used for farming. It has fair potential for cultivated crops and for small grains, hay, and pasture. It has good potential for trees and for use as wildlife habitat. It has fair to poor potential for building site development and as sites for sanitary facilities.

Droughtiness and a high susceptibility to soil blowing and water erosion are limitations to the use of this soil for farming. If this soil is used for cultivated crops, soil blowing and water erosion can further damage the soil. This soil is somewhat droughty in dry periods, although the available water capacity is high. In the upper 2 feet, this soil tends to dry out rapidly. Using field windbreaks and conservation tillage and returning crop residue to the soil help to reduce the loss of soil due to erosion.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This soil has good potential for the development of habitat for woodland or openland wildlife. A grass-legume mixture and wild herbaceous plants can be established to provide cover and food for openland wildlife. Adapted pines and native hardwoods provide food and cover for woodland wildlife.

This soil is well suited to use as woodland. In a few small areas, it is in native hardwoods. Tree seedlings survive and grow well if competing vegetation is controlled or removed. Erosion is the main hazard in planting or harvesting trees.

Shrinking and swelling limit the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength is a limitation in using this soil for local roads and streets. This limitation can be overcome by replacing the base material. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to compensate for the slow movement of effluent. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing.

Capability subclass IIIe.

781A—Friesland sandy loam, 0 to 2 percent slopes. This is a nearly level, well drained soil on terraces adjacent to streams and on upland ridgetops. The areas are crescent-shaped or are irregular in shape and range from 2 to 200 acres in size.

Typically, the upper part of the surface layer is black sandy loam about 8 inches thick, and the lower part is very dark brown and very dark grayish brown sandy loam about 12 inches thick. The subsoil is about 40 inches thick. In the upper part, it is brown to dark yellowish brown sandy loam; in the middle part, it is yellowish brown silt loam; and in the lower part, it is mixed yellowish brown and brown heavy loam. The substratum, to a depth of 60 inches, is yellowish red clay loam. In some places, the surface layer is light colored.

Included in mapping are small areas of Flagler and Billett soils. Billett soils are sandy loam throughout and are more droughty. Flagler soils are more sandy with depth. These soils are in areas similar to those of this Friesland soil. They make up 10 to 15 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is slow. The surface layer varies widely in reaction because of local liming practices. In the upper part, the subsoil is medium acid to neutral, and in the lower part, it is strongly acid.

The available water capacity is high, and the organic matter content is moderate. The shrink-swell potential in the lower part of the subsoil is moderate. The surface layer is friable and can be tilled easily. This soil is subject to water erosion and soil blowing.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for small grains, hay, and pasture. It has fair potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. If the soil is used for cultivated crops, soil blowing is a hazard. This soil is slightly droughty in dry periods because the sandy surface layer tends to dry out rapidly. The use of field windbreaks and conservation tillage and returning crop residue to the soil help to reduce the loss of soil due to erosion. Returning crop residue or adding other organic material to the soil helps to maintain fertility and to conserve soil moisture.

Shrinking and swelling limit the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to accommodate the slow movement of effluent. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability class I.

781B—Friesland sandy loam, 2 to 6 percent slopes. This is a gently sloping, well drained soil on high terraces adjacent to streams and on upland ridgetops. Areas are crescent-shaped or are irregular in shape and range from 2 to 100 acres in size.

Typically, the upper part of the surface layer is black sandy loam about 8 inches thick, and the lower part is very dark brown and very dark grayish brown sandy loam about 12 inches thick. The subsoil is about 40 inches thick. In the upper part, it is brown to dark yellowish brown sandy loam; in the middle part, it is yellowish brown silt loam; and in the lower part, it is mixed yellowish brown and brown heavy loam. The substratum, to a depth of 60 inches, is yellowish red clay loam. In some places, the surface layer is light colored. In a few areas, the seasonal water table is at a depth between 3 and 6 feet.

Included in mapping are small areas of Flagler and Billett soils. These soils are sandy throughout and are more droughty than this Friesland soil. These soils are in areas similar to those of this Friesland soil. They make up 10 to 15 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is slow. The surface layer varies widely in reaction because of local liming practices. The upper part of the subsoil is medium acid to neutral, and the lower part is strongly acid. The available water capacity is high, and the organic matter content is moderate. The shrink-swell potential in the lower part of the subsoil is moderate. The surface layer is friable and can be tilled easily. This soil is subject to water erosion and soil blowing.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and pasture. It has fair potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. If this soil is used for cultivated crops, water erosion and soil blowing are hazards. This soil is slightly droughty in dry periods because the sandy surface layer tends to dry out rapidly. The use of field windbreaks and conservation tillage and returning crop residue to the soil help to reduce the loss of soil due to erosion. Returning crop residue or adding other organic material to the soil helps to improve fertility and to conserve soil moisture.

This soil is suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

Shrinking and swelling limit the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to accommodate the slow movement of effluent. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IIe.

782—Juneau silt loam. This is a nearly level, moderately well drained soil on foot slopes and in narrow upland drainageways. Areas are irregular in shape and range from 5 to 30 acres. This soil is subject to occasional flooding for brief periods in winter and spring.

Typically, the surface layer is dark grayish brown, friable silt loam about 9 inches thick. The substratum, to a depth of 33 inches, is dark grayish brown, friable silt loam that is mixed with dark yellowish brown in the lower part. The next layer is an older buried soil that is 26 inches thick. In the upper part, it is dark yellowish brown, friable silty clay loam, and in the lower part, it is dark brown, friable heavy loam. Below that, the lower part of the substratum, to a depth of 69 inches, is dark brown clay loam. In some places, the surface layer has more sand than is typical.

Included in mapping are small areas of somewhat poorly drained Orion and Stronghurst soils in drainageways and depressions. These soils make up 5 to 10 percent of this map unit.

Permeability is moderate, and runoff is medium. This soil is medium acid to mildly alkaline throughout. The availa-

ble water capacity is high. The organic matter content is moderate. The water table is within a depth of 3 feet in spring. The frost action potential is high. The shrink-swell potential in the buried soil is moderate. The surface layer is friable and can be tilled easily within a fairly wide range in moisture content.

In most areas, this soil is used for farming. It has good potential for cultivated crops and for hay and trees. It has poor potential for building site development and as sites for sanitary facilities.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Runoff from adjacent soils causes periodic flooding after a heavy rain. Erosion is not a severe hazard; however, grassed waterways are necessary to prevent excessive loss of soil in drainageways. Using conservation tillage and returning crop residue to the soil help to reduce soil loss. Returning crop residue or adding other organic material to the soil helps to improve fertility, to reduce crusting, and to increase water infiltration.

Runoff from adjacent soils causes periodic flooding and makes this soil unsuitable for building site development or for use as septic tank absorption fields. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. Sewage lagoons need to be sealed to prevent contamination of water in the seasonal water table.

Capability class I.

783A—Flagler sandy loam, 0 to 3 percent slopes. This is a nearly level, somewhat excessively drained soil mainly on broad stream terraces. To a lesser extent, it is on low upland ridges and foot slopes. Areas are irregular in shape and range from 2 to more than 1,000 acres in size.

Typically, the upper part of the surface layer is black sandy loam about 15 inches thick, and the lower part is very dark brown sandy loam about 8 inches thick. The subsoil is about 18 inches thick. In the upper part, it is brown sandy loam, and in the lower part, it is strong brown gravelly sand. The substratum is brown and yellowish brown gravelly sand and sand. In some places, the surface layer is sandy. In places, the surface layer has more clay than is typical. In some places, it is more than 24 inches thick. In some areas, there are no gravelly layers.

Included in mapping are small areas of somewhat poorly drained Hoopeston soils and well drained Warsaw soils. Hoopeston soils are in lower or somewhat depressional areas. Warsaw soils have more clay and are less droughty than this Flagler soil. They are on a landscape similar to that of the Flagler soil. Hoopeston and Warsaw soils make up 2 to 15 percent of this map unit.

Permeability is moderately rapid in the subsoil and very rapid in the substratum. Runoff in cultivated areas is slow. The surface layer varies widely in reaction because of local liming practices. The subsoil is medium acid to neutral. The available water capacity is low or moderate, and the organic matter content is moderate. The surface layer is friable and can be worked easily within a wide range in moisture content.

In many areas, this soil is used for farming. It has fair to poor potential for cultivated crops and for hay, pasture, and trees. This soil has good potential for recreation uses. It has good potential for building site development and for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. The use of field windbreaks and conservation tillage and returning crop residue to the soil help to reduce the loss of soil due to erosion. Returning crop residue or adding other organic material to the soil helps to maintain fertility and to reduce soil blowing. Heavy applications of fertilizer generally are not beneficial because crop growth is limited by the low to moderate available water capacity.

This soil is suited to use as sites for dwellings with or without a basement. It is well suited to local roads and streets. If this soil is used as a site for septic tank absorption fields, the shallow underground aquifers can become polluted because the underlying material is very rapidly permeable. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water. The maintenance of lawns and shrubs requires the addition of water in dry periods and the frequent application of fertilizer.

Capability subclass IIIs.

783B—Flagler sandy loam, 3 to 7 percent slopes. This is a gently sloping, somewhat excessively drained soil mainly on low ridges on uplands and terraces and on upland foot slopes. Areas are irregular in shape and range from 2 to about 40 acres in size.

Typically, the upper part of the surface layer is black sandy loam about 12 inches thick, and the lower part is very dark brown sandy loam about 7 inches thick. The subsoil is about 16 inches thick. In the upper part, it is brown sandy loam, and in the lower part, it is brown sandy loam and loamy sand and has some strata of gravel. The substratum is brown and yellowish brown gravelly sand and sand. In places, the surface layer is sandy. In some places, it is more than 24 inches thick. In some areas, there are no strata of gravel.

Included in mapping are small areas of well drained Warsaw, Jasper, and Friesland soils. These soils have more clay and are less droughty than this Flagler soil. They are in positions on the landscape similar to those of the Flagler soil. These soils make up 2 to 10 percent of this map unit.

Permeability is moderately rapid in the subsoil and very rapid in the substratum. Runoff in cultivated areas is medium. The surface layer varies widely in reaction because of local liming practices. The subsoil is medium acid to neutral. The available water capacity is low or

moderate, and the organic matter content is moderate. The surface layer is friable and can be worked easily within a wide range of moisture content.

In most areas, this soil is used for farming. It has fair to poor potential for cultivated crops and for hay and pasture. It has good potential for building site development and for use as septic tank absorption fields.

This soil is suited to corn, soybeans, small grains, and grasses and legumes. Contour farming, the use of conservation tillage, and returning crop residue to the soil help to reduce erosion. Returning crop residue or adding other organic material to the soil helps to maintain fertility, to reduce soil blowing and water erosion, and to increase the rate of water intake. Heavy applications of fertilizer generally are not beneficial because crop growth is limited by the low to moderate available water capacity.

This soil is suited to use as sites for dwellings with or without a basement. This soil is well suited to use as sites for local roads and streets. The very rapid permeability in the underlying material is a limitation to the use of this soil as sites for septic tank absorption fields. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass IIIe.

802—Orthents, loamy. This map unit consists of moderately fine textured to moderately coarse textured soils that have been mixed by filling and leveling operations. Soil borings in areas of Orthents, loamy, reveal that the soil material varies widely and that there is no consistent pattern of soils. Slopes mainly are 0 to 3 percent but are as much as 15 percent in some areas.

The surface layer consists mainly of silty and loamy soil material, and the subsoil consists mainly of clay loam, loam, or silty clay loam. In some areas, the soil material is underlain by loamy glacial material.

Included in mapping are some borrow areas near highways, highway interchanges, toll stations, rest areas, and large right-of-ways. Also included are sand and gravel pits and some urban areas where concrete, asphalt, buildings, streets, and parking lots cover as much as 65 percent of the areas. Also included are areas that are used as sanitary landfills.

The available water capacity varies but generally is moderate. Permeability varies from area to area because the soil has been compacted by construction equipment and because the soil material varies. The soil material in this unit generally is low in content of organic matter and plant nutrients. Erosion is severe in areas not protected by a vegetative cover.

The vegetative cover ranges from none in newly exposed areas to a good grass sod cover in some developed areas. Sparse to dense stands of weeds are common in the older areas. In most areas, this unit is idle or is in residential or other nonfarm uses.

This unit was not assigned to a capability subclass.

864—Pits, quarry, limestone. This map unit consists mainly of quarries where limestone bedrock has been removed or has been broken and stockpiled. The material in this unit generally is dolomitic limestone that ranges from sand to boulders. Slopes range from nearly level on the quarry floor to nearly vertical on the quarry face. The quarries range from about 0.1 acre to more than 40 acres in size.

Permeability and available water capacity are extremely variable. Reaction generally is mildly alkaline to strongly alkaline. The organic matter content generally is low.

Most areas are idle, except where quarries are being excavated. The potential for cultivated crops and for hay and pasture is poor; the potential for building site development and for sanitary facilities also is poor. The potential for recreation use, especially where the quarries are no longer excavated, is fair.

In some areas, the excavations are filled with water and can provide habitat for fish and waterfowl. They can also be used for fishing and swimming.

Some of the smaller abandoned quarries are used for local solid-waste disposal. Some of the larger quarries are being used as sanitary landfill sites. If the quarries are used for solid-waste disposal, special precautions are needed to prevent underground water pollution.

This unit is not assigned to a capability subclass.

865—Pits, gravel. This map unit consists of moderately coarse textured or coarse textured material that has been mixed through excavating or piling operations. The soil material mainly is sandy or gravelly. Slopes range from 0 to more than 30 percent. The pits range in size from 0.1 acre to more than 100 acres.

The soil material consists mainly of sandy or gravelly substratum material. The surface layer and subsoil have been removed or mixed during excavation.

Permeability and the available water capacity are extremely variable. The soil material generally is mildly alkaline to strongly alkaline. The organic matter content generally is low.

In most areas, this unit is idle. In some areas, the pits are currently being excavated. This unit has poor potential for cultivated crops and for hay and pasture. It has poor potential for building site development and as sites for sanitary facilities. It has fair potential for recreation use, especially if the pits are no longer used for excavation.

In some areas, the excavations are filled with water and can provide habitat for fish and waterfowl. They can also be used for fishing and swimming.

The nearly level floor of a large pit can be used as a site for park or playground facilities or, in some cases, for landfill. If a pit is used for solid-waste disposal, special precautions are needed to prevent ground-water pollution.

This unit is not assigned to a capability subclass.

939C2—Rodman-Warsaw complex, 4 to 7 percent slopes, eroded. This map unit consists of sloping, well drained and excessively drained soils on upland kames and eskers and on stream-terrace breaks. It is 40 to 55 percent Rodman soil and 30 to 40 percent Warsaw soil. Areas range from 2 to about 40 acres in size. The Rodman soil is on sharp slope breaks and narrow ridges, and the Warsaw soil is on broader ridges and lesser slopes. These soils are so intermingled or the areas of each soil are so small that it was not practical to separate them in mapping at the scale used.

Typically, the surface layer of the Rodman soil is very dark brown gravelly loam about 7 inches thick. The subsoil is dark brown gravelly loam 7 inches thick. The substratum, to a depth of 60 inches, is dark yellowish brown, calcareous sand and gravel. In some places, calcareous sand and gravel are at the surface.

Typically, the surface layer of the Warsaw soil is dark brown loam about 13 inches thick. The subsoil is about 18 inches thick. In the upper part, it is brown, friable loam, and in the lower part, it is dark reddish brown gravelly loam. The substratum, to a depth of about 60 inches, is yellowish brown, calcareous sand and gravel. In a few places, the surface layer has more sand than is typical.

Permeability is very rapid in the Rodman soil. It is moderate in the upper part of the Warsaw soil and rapid in the lower part. The available water capacity is low in the Rodman soil and moderate in the Warsaw soil. The organic matter content is moderate. Runoff in cultivated areas is medium. The root zone is restricted by the calcareous sand and gravel.

In most areas, these soils are used for farming. They have poor potential for cultivated crops and fair potential for small grains, hay, and pasture. They have good to fair potential for building site development and for use as septic tank absorption fields.

These soils are best suited to small grains and grasses and legumes. If these soils are used for corn and soybeans, the shallow root zone causes droughty conditions in dry periods. If these soils are used for cultivated crops, erosion is a hazard. Contour farming, the use of conservation tillage, and returning crop residue to the soil help to reduce the loss of soil due to erosion.

These soils are suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

These soils are suitable for building site development and for use as septic tank absorption fields. The effluent from septic tank absorption fields can contaminate ground water because of seepage. Low strength is a limitation in using the Warsaw soil for local roads and streets. This limitation can be overcome by replacing the base material. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water.

Capability subclass VIs.

939D2—Rodman-Warsaw complex, 7 to 12 percent slopes, eroded. This map unit consists of strongly sloping, well drained and excessively drained soils on upland kames and eskers and on stream-terrace breaks. It is 45 to 60 percent Rodman soil and 25 to 35 percent Warsaw soil. Areas are linear in shape and range from 2 to about 40 acres in size. The Rodman soil is on sharp slope breaks and narrow ridges, and the Warsaw soil is on broader ridges and lesser slopes. These soils are so intermingled or the areas of each soil are so small that it was not practical to separate them in mapping at the scale used.

Typically, the surface layer of the Rodman soil is very dark brown gravelly loam about 7 inches thick. The subsoil is dark brown gravelly loam 6 inches thick. The substratum, to a depth of 60 inches, is dark yellowish brown, calcareous sand and gravel. In cultivated areas, the present surface layer is a mixture of material from the original surface layer and the subsoil. In places, the calcareous sand and gravel are at the surface.

Typically, the surface layer of the Warsaw soil is very dark grayish brown loam about 11 inches thick. The subsoil is about 14 inches thick. In the upper part, it is brown, friable clay loam, and in the lower part, it is dark reddish brown gravelly loam. The substratum, to a depth of about 60 inches, is yellowish brown, calcareous sand and gravel. In some places, the surface layer is light colored, and in a few places, it has more sand than is typical.

Permeability is very rapid in the Rodman soil. It is moderate in the upper part of the Warsaw soil and rapid in the lower part. The available water capacity is low in the Rodman soil and moderate in the Warsaw soil. The organic matter content is moderate. Runoff in cultivated areas is medium. The root zone is restricted by the calcareous sand and gravel.

In most areas, these soils are used for farming. They have poor potential for cultivated crops and fair potential for small grains, hay, and pasture. They have fair potential for building site development and for use as septic tank absorption fields. They have good potential for openland and woodland wildlife habitat.

These soils are not suited to corn and soybeans. Droughtiness, caused by the restricted root zone and the low available water capacity, is a limitation to crops.

These soils are suitable for use as pastureland and hayland. Overgrazing reduces the yield of forage and causes surface compaction, excessive runoff, and erosion. Plantings for pasture and hay, pasture rotation, timely deferment of grazing, and fertilization help to keep pasture and soil in good condition and help to control erosion.

This unit is well suited to use as habitat for openland and woodland wildlife. Habitat elements include grain and seed crops, domestic grasses and legumes, wild herbaceous plants, hardwood trees, and coniferous plants.

These soils are suitable for building site development if the slopes are smoothed. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. Septic tank absorption field lines need to be designed and placed on the contour to insure an even distribution of effluent. If these soils are used as a site for septic tank absorption fields or sewage lagoons, ground water can become contaminated because the substratum is rapidly permeable. The bottom of sewage lagoons needs to be sealed to prevent the contamination of ground water. Slope is a limitation for sewage lagoons. This limitation can be overcome by smoothing.

Capability subclass VIs.

2145B—Urban land-Saybrook complex, 1 to 7 percent slopes. This map unit consists of Urban land and gently sloping or sloping, well drained soils on upland divides and side slopes. It is 50 to 65 percent Urban land and 20 to 35 percent Saybrook soil. Areas range from 30 to 500 acres in size. Urban land and the Saybrook soil are so intermingled that it was not practical to separate them in mapping at the scale used.

Urban land consists of areas covered by streets, parking lots, buildings, and other structures that obscure or alter the soils and make identification unfeasible.

Typically, the upper part of the surface layer of the Saybrook soil is very dark gray, friable silt loam about 9 inches thick, and the lower part is dark brown silt loam about 5 inches thick. The subsoil is about 21 inches thick. In the upper part, it is dark brown and brown silty clay loam, and in the lower part, it is dark yellowish brown clay loam. The substratum, to a depth of 60 inches, is olive brown, calcareous loam. In some places, the subsoil is deeper to calcareous loam than is typical. In places, the surface layer is thinner than is typical. In some places, the surface layer and the upper part of the subsoil have more sand. In some areas, the surface layer is light colored. In areas that have been cut, built-up, or smoothed during construction, this soil has been radically altered.

Included in mapping and making up 2 to 10 percent of this map unit are small areas of poorly drained Drummer soils and somewhat poorly drained Elburn, Herbert, La Hogue, Lisbon, and Odell soils. These soils are in drainageways and depressions.

Permeability in the Saybrook soil is moderate or moderately slow. The shrink-swell potential in the subsoil is moderate. Available water capacity and the organic matter content are high. The subsoil is medium acid to neutral.

The Saybrook soil is used as sites for parks, open areas, buildings, and lawns and gardens. It has good potential for lawns, grasses, vegetables and flowers in gardens, and for trees and shrubs. It has fair to good potential for most recreation uses and for building site development.

The Saybrook soil is well suited to grasses, flowers, vegetables, trees, and shrubs. Water erosion is a hazard, especially in the more sloping areas. During construction, this soil should not be left bare; a temporary or permanent vegetative cover can protect the soil from erosion.

The Saybrook soil is suitable for most building site developments and for most recreation uses. When designing and constructing dwellings, small commercial buildings, and local roads and streets, frost action and the shrink-swell potential need to be considered. Low strength and frost action are limitations for local roads and streets, but these can be overcome by using the underlying material as subgrade and by providing surface drainage. If this soil is used as a site for septic tank absorption fields, the absorption area needs to be large enough to accommodate the slow movement of effluent. Playgrounds can be established in the less sloping areas of this unit.

This complex is not assigned to a capability subclass.

2354A—Urban land-Hononegah complex, 0 to 3 percent slopes. This map unit consists of Urban land and of nearly level, excessively drained soils on broad terraces along major streams. It is 50 to 65 percent Urban land and 20 to 35 percent Hononegah soil. Areas range from 50 to 1,000 acres in size. Urban land and the Hononegah soil are so intermingled that it was not practical to separate them in mapping at the scale used.

Urban land consists of areas covered by streets, parking lots, buildings, and other structures that obscure or alter the soils and make identification unfeasible.

Typically, the upper part of the surface layer of the Hononegah soil is very dark brown loamy coarse sand about 15 inches thick, and the lower part is very dark brown and dark brown loamy coarse sand about 4 inches thick. The subsoil is about 12 inches thick. In the upper part, it is dark yellowish brown loamy coarse sand, and in the lower part it is dark yellowish brown, very gravelly loamy coarse sand. The substratum, to a depth of about 60 inches, is yellowish brown, calcareous, very gravelly loamy coarse sand. In places, the surface layer and subsoil are loamy. In some areas, mainly along terrace escarpments, slopes are more than 3 percent. In areas where this soil has been used for construction and has been cut, built-up, or smoothed, this soil is radically altered.

Included in mapping and making up 10 to 20 percent of this map unit are areas of Warsaw, Wea, and Flagler soils. These soils are more clayey in the surface layer and subsoil than this Hononegah soil.

Permeability in the Hononegah soil is very rapid. The surface layer varies widely in reaction. The subsoil is neutral to medium acid. The available water capacity is low. The organic matter content is moderately low.

The Hononegah soil is used as sites for parks, open areas, buildings, and lawns and gardens. It has poor to fair potential for lawn grasses, vegetables and flowers in gardens, and for trees and shrubs. It has fair to good potential for recreation uses and for building site development.

The Hononegah soil is poorly suited to grasses, flowers, vegetables, trees, and shrubs. Lawns, gardens, and shrubs need to be watered, particularly in summer. This soil is suited to drought-tolerant plants that can survive despite the low available water capacity of this soil. Water erosion is not a major hazard. The surface dries rapidly, and soil blowing is a hazard if the soil is disturbed and left bare. A temporary or permanent vegetative cover helps to protect this soil from soil blowing.

The Hononegah soil is well suited to use as building sites and moderately suited to recreation use. Maintaining a grass cover in extensive recreation areas that are subject to heavy foot traffic is difficult because of the droughtiness of this soil. This soil has sufficient strength and stability to support streets and low buildings. Trenches and excavations need to be stabilized to prevent cave-ins. If this soil is used as a site for septic tank absorption fields, ground water can become contaminated because of the very rapid permeability. Slope is a limitation to construction in areas of terrace escarpments.

This complex is not assigned to a capability subclass.

2363B—Urban land-Griswold complex, 1 to 7 percent slopes. This map unit consists of Urban land and of gently sloping or sloping, well drained soils on drainage divides and side slopes on uplands. It is 50 to 65 percent Urban land and 20 to 35 percent Griswold soil. Areas range from 80 to 1,000 acres in size. Urban land and the Griswold soil are so intermingled that it was not practical to separate them in mapping at the scale used.

Urban land consists of areas covered by streets, parking lots, buildings, and other structures that obscure or alter the soils and make identification of the soils unfeasible.

Typically, the surface layer of the Griswold soil is very dark grayish brown sandy loam about 12 inches thick. The subsoil is about 18 inches thick. In the upper part, it is brown, friable clay loam, and in the lower part, it is brown, friable loam. The substratum, to a depth of 60 inches, is light yellowish brown, calcareous sandy loam. In some areas, the surface layer is less sandy than is typical, and in some areas it is light colored. In places, the subsoil is deeper to calcareous sandy loam than is typical. In some places, it is reddish brown clay loam. In areas that have been cut, built-up, or smoothed during construction, this soil is radically altered.

Included in mapping and making up 5 to 10 percent of this map unit are small areas of Rockton, Dodgeville, and Friesland soils. Rockton and Dodgeville soils have dolomitic bedrock within a depth of 40 inches. Friesland soils are silty in the lower part of the subsoil and in the substratum.

Permeability in the Griswold soil is moderate. The available water capacity and the organic matter content are moderate. The surface layer varies widely in reaction. The subsoil is neutral to medium acid.

The Griswold soil is used as sites for parks, open areas, buildings, and lawns and gardens. It has fair potential for lawn grasses, vegetables and flowers in gardens, and trees and shrubs. It has fair to good potential for most recreation uses and for building site development.

The Griswold soil is suited to grasses, flowers, vegetables, trees, and shrubs. In gardening or landscaping, care should be taken to avoid exposing the calcareous substratum material. This calcareous material can hinder the growth of many plants. This soil is somewhat droughty, and lawns and gardens generally need to be watered in summer. This soil is subject to water erosion and soil blowing. During construction, this soil should not be left bare; temporary or permanent vegetative cover helps to protect this soil from erosion.

In most areas, the Griswold soil is well suited to building site development and to recreation uses. Frost action is a limitation to building foundations, sidewalks, and local roads and streets. This limitation can be overcome by using the underlying material as subgrade and by providing surface drainage. Playgrounds can be established in the less sloping areas.

This complex is not assigned to a capability subclass.

2363D—Urban land-Griswold complex, 7 to 15 percent slopes. This map unit consists of Urban land and of sloping or strongly sloping, well drained soils on upland side slopes. It is 50 to 65 percent Urban land and 20 to 35 percent Griswold soil. Areas range from 60 to 500 acres in size. Urban land and the Griswold soil are so intermingled that it was not practical to separate them in mapping at the scale used.

Urban land consists of areas covered by streets, parking lots, buildings, and other structures that obscure or alter the soils and make identification of the soils unfeasible.

Typically, the surface layer of the Griswold soil is very dark grayish brown sandy loam about 7 inches thick. The subsoil is about 17 inches thick. In the upper part, it is brown, friable clay loam, and in the lower part, it is brown, friable loam. The substratum, to a depth of 60 inches, is light yellowish brown, calcareous sandy loam. In some areas, the surface layer is light colored. In places, the surface layer and the upper part of the subsoil are less sandy than is typical. In some places, the subsoil is reddish brown clay loam. In places, calcareous

sandy loam glacial till material is at or near the surface. In areas that have been cut, built-up, or smoothed during construction, this soil is radically altered.

Included in mapping and making up 5 to 10 percent of this map unit are small areas of Rockton, Dodgeville, Backbone, Edmund, Sogn, Whalan, and NewGlarus soils. These soils are in positions on the landscape similar to those of the Griswold soil. They are underlain by dolomitic bedrock at a depth ranging from 10 inches in the Edmund and Sogn soils to 40 inches in the other soils.

Permeability in the Griswold soil is moderate. The available water capacity and the organic matter content are moderate. The surface layer varies widely in reaction. The subsoil is neutral to medium acid.

The Griswold soil is used as sites for parks, open areas, buildings, lawns, and gardens. It has poor to fair potential for lawn grasses, vegetables and flowers in gardens, trees, and shrubs. It has fair potential for most recreation uses and for building site development.

The Griswold soil is suited to grasses, flowers, vegetables, trees, and shrubs. In gardening or landscaping, care should be taken to avoid exposing the calcareous substratum material. To help establish a vegetative cover on construction sites, the surface layer material can be stockpiled during construction and the original material or supplemental material can be replaced during landscaping. Applying fertilizer and watering lawns and gardens in dry periods can help vegetative growth. This soil is subject to water erosion and soil blowing, and the surface should not be left bare. A temporary or permanent vegetative cover helps to protect this soil from erosion.

In most areas, the Griswold soil is suited to building site development and to recreation uses. The steepness of slopes is a major limitation. Frost heave in the subsoil is a possible hazard, but it can be reduced by using the underlying material as subgrade. Designing streets and septic tank absorption fields on the contour can help to overcome the slope limitation. This soil can be used as sites for recreation developments such as paths and trails and picnic areas. It is not well suited to playgrounds and campgrounds because of the steepness of slopes.

This complex is not assigned to a capability subclass.

2386B—Urban land-Downs complex, 1 to 7 percent slopes. This map unit consists of Urban land and of gently sloping or sloping, well drained soils mainly on upland divides and side slopes. It is 50 to 65 percent Urban land and 20 to 35 percent Downs soil. Areas range from 50 to 1,000 acres in size. Urban land and the Downs soil are so intermingled that it was not practical to separate them in mapping at the scale used.

Urban land consists of areas covered by streets, parking lots, buildings, and other structures that obscure or alter the soils and make identification of the soils unfeasible.

Typically, the surface layer of the Downs soil is very dark grayish brown silt loam about 7 inches thick. The subsoil is about 40 inches thick. In the upper part, it is dark yellowish brown, friable silty clay loam, and in the lower part, it is dark yellowish brown, friable silt loam. The substratum, to a depth of 60 inches, is yellowish brown silt loam. In some places, the surface layer is thicker than is typical, and in some places it is light colored. In some areas, the surface layer is sandy loam. In places, the lower part of the subsoil and the substratum are reddish- or yellowish-colored loamy material. In some areas, the slopes are more than 7 percent. In areas that have been cut, built-up, or smoothed during construction, this soil is radically altered.

Included in mapping and making up 5 to 15 percent of this map unit are small areas of Atterberry, Rockton, Dodgeville, and Hitt soils. Atterberry soils are somewhat poorly drained and are in drainageways and depressions. Rockton and Dodgeville soils have dolomitic bedrock within a depth of 40 inches. Hitt soils have dolomitic bedrock at a depth between 40 and 60 inches.

Permeability of the Downs soil is moderate. The available water capacity is high, and the organic matter content is moderate. The shrink-swell potential of the subsoil is moderate. The subsoil is strongly acid to mildly alkaline.

The Downs soil is used as a site for parks, open areas, buildings, lawns, and gardens. It has good potential for lawn grasses, vegetables and flowers in gardens, and trees and shrubs. It has fair to good potential for most recreation uses and for building site development.

The Downs soil is well suited to grasses, flowers, vegetables, trees, and shrubs. In the more sloping areas, water erosion is a hazard, and this soil should not be left bare during construction. A temporary or permanent vegetative cover helps to protect this soil from erosion.

In most areas, the Downs soil is well suited to building site development and to recreation uses. Frost action and the shrink-swell potential are limitations, and they should be considered in designing building foundations, sidewalks, and local roads and streets. In constructing small commercial buildings, additional cuts and fills in the more sloping areas are a problem. Playgrounds can be established in the less sloping areas.

This complex is not assigned to a capability subclass.

2398A—Urban land-Wea complex, 0 to 3 percent slopes. This map unit consists of Urban land and of nearly level or gently sloping, well drained soils on broad terraces in major stream valleys. It is 50 to 65 percent Urban land and 20 to 35 percent Wea soil. Areas range from 20 to 1,000 acres in size. Urban land and the Wea soil are so intermingled that it was not practical to separate them in mapping at the scale used.

Urban land consists of areas covered by streets, parking lots, buildings, and other structures that obscure or

alter the soils and make identification of the soils unfeasible.

Typically, the upper part of the surface layer of the Wea soil is very dark brown silt loam about 8 inches thick, and the lower part is very dark grayish brown silt loam about 7 inches thick. The subsoil is about 43 inches thick. In the upper part, it is brown clay loam; in the middle part, it is brown sandy clay loam; and in the lower part, it is mixed brown and dark brown, gravelly sandy clay loam. The substratum, to a depth of 60 inches, is mixed brown and yellowish brown, calcareous sand and gravel. In some areas, the surface layer is light colored. In places, the upper part of the subsoil has less sand than is typical. In some places, there is no gravel in this soil above a depth of 60 inches. In some areas, the slopes are more than 3 percent. In areas that have been cut, built-up, or smoothed during construction, this soil is radically altered.

Included in mapping and making up 2 to 10 percent of this map unit are small areas of Flagler, La Hogue, and Hononegah soils. Flagler soils are somewhat excessively drained, and Hononegah soils are excessively drained; these soils are in positions on the landscape similar to those of this Wea soil and are more sandy than this soil. La Hogue soils are somewhat poorly drained and are in depressions and drainageways.

Permeability in the Wea soil is moderate in the subsoil and very rapid in the substratum. The available water capacity is high. The organic matter content is moderate. The shrink-swell potential is moderate in the subsoil. The subsoil is strongly acid to neutral.

The Wea soil is used as sites for parks, open areas, buildings, lawns, and gardens. This soil has good potential for lawns, grasses, vegetables and flowers in gardens, trees, and shrubs. It has good potential for most engineering and recreation uses.

The Wea soil is well suited to grasses, flowers, vegetables, trees, and shrubs. In the more sloping areas, water erosion is a hazard, and this soil should not be left bare during construction. A temporary or permanent vegetative cover helps to protect this soil from erosion.

Shrinking and swelling are a limitation to the use of the Wea soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. This soil is well suited to septic tank absorption fields, but the effluent can contaminate ground water because of seepage. Low strength and frost action are limitations in using this soil for local roads and streets. These limitations can be overcome by replacing the base material. Care is needed to prevent the underlying material in trenches and excavations from caving in.

This complex is not assigned to a capability subclass.

2566B—Urban land-Rockton complex, 1 to 7 percent slopes. This map unit consists of Urban land and of gently sloping or sloping, well drained soils on upland ridges and side slopes. It is 50 to 65 percent Urban land and 20 to 35 percent Rockton soil. Areas range from 20 to 150 acres in size. The Urban land and the Rockton soil are so intermingled that it was not practical to separate them in mapping at the scale used.

Urban land consists of areas covered by streets, parking lots, buildings, and other structures that obscure or alter the soils and make identification of the soils unfeasible.

Typically, the surface layer of the Rockton soil is very dark gray loam about 10 inches thick. The subsoil is about 15 inches thick. In the upper part, it is dark yellowish brown clay loam; in the middle part, it is dark brown clay loam; and in the lower part, it is dark brown clay. Fractured dolomitic bedrock is at a depth of about 25 inches. In some areas, this soil is more silty in the upper part and more clayey in the lower part than is typical. In some places, the depth to bedrock is less than 20 inches, and in other places, it is more than 40 inches. In some areas, slopes are more than 7 percent. In some areas, the surface layer is light colored. In areas that have been cut, built-up, or smoothed during construction, this soil is radically altered.

Included in mapping and making up 5 to 10 percent of this map unit are small areas of Griswold, Kidder, and Downs soils. These soils are deep to bedrock. Griswold and Kidder soils formed in sandy loam glacial till. Downs soils formed in silty material.

Permeability in the Rockton soil is moderate. The available water capacity is low. The organic matter content is moderate. The shrink-swell potential is moderate in the upper part of the subsoil and high in the lower part. The Rockton soil is neutral to strongly acid throughout.

The Rockton soil is used as sites for parks, open areas, buildings, lawns, and gardens. It has fair potential for lawn grasses, vegetables and flowers in gardens, trees and shrubs. It has fair to good potential for most recreation and engineering uses.

The Rockton soil is suited to grasses, vegetables, trees, and shrubs. Artificial watering of lawns and gardens is needed in summer because of the low available water capacity. Water erosion is a hazard, especially in the more sloping areas. During construction, this soil should not be left bare; temporary or permanent vegetative cover helps to protect this soil from erosion. In gardening or landscaping, care should be taken to avoid exposing the dolomitic bedrock, particularly in the more sloping areas or in areas where bedrock is at a depth of less than 20 inches. The shallowness to bedrock causes drought stress, and the high lime content of the dolomitic bedrock hinders the growth of many plants.

Shrinking and swelling are a limitation to the use of this soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil, by placing the foundation in

material that has low shrink-swell potential, or by extending the foundation to bedrock. Excavations for basements are limited by the shallowness to bedrock. Onsite septic systems can cause a serious pollution hazard. Fractures in the bedrock can allow contaminants to pollute the underground water. The cost of construction for buildings that require excavations or underground utilities is higher than that for buildings on other soils because the bedrock is at a moderate depth. The cost is higher in more sloping areas and in areas that are more shallow to bedrock. In the upper few feet, the bedrock generally is rippable using medium-sized construction equipment. Playgrounds can be established in the less sloping areas.

This complex is not assigned to a capability subclass.

2776—Urban land-Comfrey complex. This map unit consists of Urban land and of nearly level or depressional, poorly drained soils in alluvial areas. It is 50 to 65 percent Urban land and 20 to 35 percent Comfrey soil. Areas range from 30 to 800 acres in size. Urban land and the Comfrey soil are so intermingled that it was not practical to separate them in the mapping at the scale used. The Comfrey soil is subject to common flooding for brief to long periods in spring.

Urban land consists of areas covered by streets, parking lots, buildings, and other structures that obscure or alter the soils and make identification of the soils unfeasible.

Typically, the upper part of the surface layer of the Comfrey soil is black loam about 17 inches thick, and the lower part is very dark gray clay loam about 9 inches thick. The substratum, to a depth of 60 inches, is grayish brown and gray loam, sandy loam, and loamy fine sand. In most areas, the soil is stratified. In some places, the surface layer is more than 36 inches thick. In places, it is light colored. In some places, the depth to the seasonal water table is 1 to 3 feet. In places, the surface layer and subsoil have less sand than is typical.

Included in mapping are small areas of very poorly drained, organic Adrian, Houghton, and Palms soils and well drained Troxel soils. These soils make up 10 to 15 percent of this map unit.

Permeability is moderate, and runoff in cultivated areas is slow. The available water capacity and the organic matter content are high. This soil has a seasonal water table at or near the surface. This soil is slightly acid to mildly alkaline. The shrink-swell potential is moderate. The surface layer generally is friable and can be tilled easily within a fairly wide range in moisture content.

The Comfrey soil is used as sites for parks, open areas, buildings, lawns, and gardens. It has fair to good potential for lawn grasses, vegetables and flowers in gardens, trees and shrubs. The seasonal high water table and the overflow hazard limit the use of this soil. In areas that are protected from overflow by dikes or levees, this soil is better suited to these uses.

In most areas, the Comfrey soil is poorly suited to building site development and to recreation uses. It does not have sufficient strength and stability to support vehicular traffic. Shrinking and swelling of the soil, the high water table, and flooding are limitations to building site development. Special engineering designs and construction techniques can help to overcome these limitations; however, they are costly. Onsite sewage disposal systems function poorly or fail completely because of the seasonal high water table and the occasional flooding.

This complex is not assigned to a capability subclass.

2781B—Urban land-Friesland complex, 1 to 7 percent slopes. This map unit consists of Urban land and of gently sloping or sloping, well drained soils on upland divides and side slopes. It is 50 to 65 percent Urban land and 20 to 35 percent Friesland soil. Areas range from 50 to 300 acres in size. Urban land and the Friesland soil are so intermingled that it was not practical to separate them in mapping at the scale used.

Urban land consists of areas covered by streets, parking lots, buildings, and other structures that obscure or alter the soils and make identification of the soils unfeasible.

Typically, the upper part of the surface layer of the Friesland soil is black sandy loam about 8 inches thick, and the lower part is very dark grayish brown sandy loam about 12 inches thick. The subsoil is about 40 inches thick. In the upper part, it is dark brown and dark yellowish brown sandy loam; in the middle part, it is yellowish brown silt loam; and in the lower part, it is mixed yellowish brown and dark brown loam. In some places, the surface layer is thinner than is typical, and in other places, it is light colored. In places, the sand content increases with depth. In some areas that have been cut, built-up, or smoothed during construction, this soil is radically altered.

Included in mapping and making up 2 to 10 percent of this map unit are small areas of Tama and Backbone soils. These soils are in positions on the landscape similar to those of this Friesland soil. Tama soils formed entirely in silty material. Backbone soils have a sandy surface layer and have dolomitic bedrock at a depth between 20 and 40 inches.

Permeability in the Friesland soil is moderate. The available water capacity is moderate or high. The organic matter content is moderate. The shrink-swell potential in the subsoil is moderate. This soil is neutral to strongly acid.

The Friesland soil is used as sites for parks, open areas, buildings, lawns, and gardens. It has fair to good potential for lawn grasses, vegetables and flowers in gardens, trees and shrubs. It has fair to good potential for most recreation and engineering uses.

The Friesland soil is suited to grasses, flowers, vegetables, trees, and shrubs. Water erosion and soil blowing are hazards, and this soil should not be left bare during

construction. A temporary or permanent vegetative cover helps to protect this soil from erosion. The sandy loam surface layer is somewhat droughty for shallow-rooted plants. Lawns, gardens, and shrubs need to be watered in summer.

Shrinking and swelling are a limitation to the use of the Friesland soil as building sites. This limitation can be overcome by designing foundations to withstand the shrinking and swelling of the soil or by placing the foundation in material that has low shrink-swell potential. This soil is well suited to most recreation uses. Playgrounds should be established in the less sloping areas.

This complex is not assigned to a capability subclass.

2783A—Urban land-Flagler complex, 0 to 3 percent slopes. This map unit consists of Urban land and of nearly level, somewhat excessively drained soils on broad terraces along major streams. It is 50 to 65 percent Urban land and 20 to 35 percent Flagler soil. Areas range from 30 to 1,000 acres in size. Urban land and the Flagler soil are so intermingled that it was not practical to separate them in mapping at the scale used.

Urban land consists of areas covered by streets, parking lots, buildings, and other structures that obscure or alter the soils and make identification of the soils unfeasible.

Typically, the upper part of the surface layer of the Flagler soil is black sandy loam about 15 inches thick, and the lower part is very dark brown sandy loam about 8 inches thick. The subsoil is about 13 inches thick. In the upper part, it is brown sandy loam, and in the lower part, it is brown, very gravelly loamy sand and gravelly sand. The substratum, to a depth of 60 inches, is brown and yellowish brown gravelly sand and sand. In places, the surface layer has more clay than is typical. In some areas, this soil is more gravelly than is typical; in other areas, there is no gravel in this soil. In some areas, mainly on terrace breaks or on upland foot slopes, slopes are more than 3 percent. In areas that have been cut, built-up, or smoothed during construction, this soil is radically altered.

Included in mapping and making up 2 to 5 percent of this map unit are areas of Hoopeston, Jasper, and Wea soils. Hoopeston soils are somewhat poorly drained and are in small depressions. Jasper and Wea soils have more clay throughout than this Flagler soil.

Permeability is moderately rapid in the subsoil and very rapid in the substratum. The available water capacity is low or moderate. The organic matter content is moderate. The surface layer varies widely in reaction. The subsoil is medium acid to neutral.

The Flagler soil is used as sites for parks, open areas, buildings, lawns, and gardens. It has fair potential for lawn grasses, vegetables and flowers in gardens, trees and shrubs. It has good potential for most recreation and engineering uses.

The Flagler soil is suited to grasses, flowers, vegetables, trees, and shrubs. Lawns, gardens, and shrubs need to be watered, particularly in summer. This soil is suited to drought-tolerant plants that can survive despite the low or moderate available water capacity of this soil. Water erosion is not a major hazard, except in the more sloping areas. Soil blowing is a hazard if this soil is disturbed and left bare. A temporary or permanent vegetative cover helps to protect this soil from erosion.

The Flagler soil is well suited to building site development and recreation uses. Maintaining a grass cover is difficult in extensive recreation areas that are subject to heavy foot traffic because this soil is droughty. Supplemental watering in dry periods helps to overcome the droughtiness limitation. This soil has sufficient strength and stability to support streets and low buildings. Trenches and excavations need to be stabilized to prevent cave-ins. If this soil is used as a site for onsite septic systems, the ground water can become polluted. A sanitary sewer connected to a treatment plant can be used to dispose of waste. In the more sloping areas on terrace escarpments, cuts and fills for construction are more costly.

4776—Comfrey loam, ponded. This is a depressional, ponded soil that is mainly in sloughs, old stream channels, and oxbows in alluvial areas throughout Winnebago and Boone Counties. Areas generally are curved or linear in shape and range from 2 to about 100 acres in size.

Typically, this soil is covered by water 1 to 5 feet deep. The surface layer typically is black loam, about 6 inches thick, and, below that, black and very dark gray clay loam, about 20 inches thick. The substratum is gray or grayish brown stratified loam, sandy loam, and loamy fine sand. In some areas, the surface layer is more clayey and silty and less sandy than is typical. In some areas, it is dark gray or gray.

Included in mapping are small areas of very poorly drained, organic Houghton, Adrian, and Palms soils and poorly drained Marshan soils. Houghton, Adrian, and Palms soils are very high in organic matter content. Marshan soils have a substratum of coarse sand. The included soils are in positions on the landscape similar to those of this Comfrey soil and make up 2 to 5 percent of this map unit.

Permeability, available water capacity, runoff, and other characteristics cannot be rated because this soil is ponded.

In most areas, this soil is idle. It has poor potential for cultivated crops and for hay and pasture. It also has poor potential for engineering uses and for most recreation uses. It has good potential for the development of habitat for wetland wildlife.

This soil is not suited to cultivated crops, small grains, or pasture. Because this soil is ponded, it is extremely difficult to farm.

This soil has good potential for the preservation or development of habitat for wetland wildlife. The native plant cover provides good food and cover for wetland wildlife, including ducks, muskrats, mink, and shore birds. Openwater areas can easily be established.

This soil is not suited to building site development or onsite sewage disposal. The ponding on this soil is a limitation that is extremely difficult and expensive to overcome.

Capability subclass VIw.

Use and management of the soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Soil maps for detailed planning." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

In 1967, according to the Conservation Needs Inventory, more than 387,404 acres in the survey area was used for crops and as pasture. Of this total, 33,500 acres was used as permanent pasture; 253,600 acres for row crops, mainly corn; 40,064 acres for closegrown crops, mainly wheat and oats; and 50,551 acres for rotation hay and pasture. The remaining 27,689 acres was used for conservation, for orchards, as hayland, and as idle land; however, since the 1967 Conservation Needs Inventory, most of this acreage and much of the acreage in rotation hay and pasture have been returned to use as cropland due to the increased emphasis on row crop production.

The potential of the soils in this survey area for increased production of food crops is very good. A very limited number of acres of potentially good cropland are currently being used as woodland or pasture. Food crop production can be increased considerably by extending the latest crop production technology to all cropland in the counties.

The acreage in crops and pasture has gradually decreased as more land is used for urban development. In 1967, it was estimated that about 57,000 acres in the survey area was urban and built-up land; this acreage has been increasing at the rate of about 1,000 acres per year. The use of this soil survey in making land-use decisions that can influence the future role of farming in the survey area is discussed in the section "General soil map for broad land use planning."

Soil erosion is the major hazard on about 57 percent of the cropland and pastureland in the survey area. Erosion is a hazard if the slope is more than 2 percent. Ashdale, Fayette, Flagg, Griswold, and Winnebago soils, for example, have slopes of more than 2 percent.

If surface layer material is lost through erosion, the environment is damaged in two ways. First, productivity of the soils is reduced as the surface layer is eroded and subsoil material is incorporated into the plow layer. The loss of surface layer material is especially damaging to soils that have a clay loam subsoil, for example, Westville and Winnebago soils, and on soils that have a layer in or below the subsoil that restricts the depth of the root zone. Layers that restrict the rooting depth include a paleosol, which Assumption and Elco soils have, or bedrock, which Backbone, Dunbarton, Dodgeville, Edmund, NewGlarus, Rockton, Sogn, and Whalan soils have. Erosion also reduces the productivity of soils that tend to be

droughty, for example, Rodman gravelly loam and Hononegah soils.

Second, soil erosion results in sedimentation in streams. Controlling erosion minimizes the pollution of streams by sediment and improves the quality of water for municipal use, for recreation use, and for fish and wildlife.

Conservation management helps to maintain a protective surface cover, to reduce runoff, and to increase the rate of water infiltration. A cropping system that maintains a vegetative cover on the soil surface can hold soil losses due to erosion to an amount that does not reduce soil productivity. On livestock farms, which require pasture and hay crops, including legume and grass forage crops in the cropping system helps to reduce erosion on sloping soils, provides nitrogen for crops, and improves soil tilth.

Terraces and diversions reduce the length of slopes and thus reduce runoff and erosion. Deep, well drained soils that have regular slopes, for example, Tama, Fayette, and Downs soils, are best suited to terraces. Other soils are not so well suited to terraces and diversions because they have irregular slopes, excessive wetness in terrace channels, a clayey subsoil that could be exposed in terrace channels, or bedrock at a depth of less than 40 inches.

Contour farming and contour stripcropping are widely used to control erosion in the survey area. They are best suited to soils that have smooth, uniform slopes; however, they can also be used on soils that do not have uniform slopes.

In some areas of the strongly sloping Dodgeville, Dunbarton, Edmund, Griswold, Kidder, McHenry, NewGlarus, Rockton, Rodman, Sogn, Warsaw, Whalan, and Winnebago soils, the slopes are too short or too irregular for the use of contour tillage or terraces. In these areas, using a cropping system that provides a substantial vegetative cover, keeping tillage to a minimum, and returning crop residue to the soil are necessary to control erosion.

Soil blowing is a hazard on the sandy Chelsea and Hononegah soils and on the muck soils—Adrian, Houghton, and Palms soils. Soil blowing can damage these soils in a few hours if winds are strong and if the soils are dry and bare of vegetation or surface mulch. Maintaining a vegetative cover, surface mulch, or a rough surface through the use of conservation tillage minimizes soil blowing on these soils. Establishing field windbreaks of adapted shrubs such as Tatarian honeysuckle or autumn-olive or of trees such as red and white pine is effective in reducing soil blowing on the mucky or sandy soils.

Information on the design of erosion-control practices for each soil is provided in the Technical Guide, which is available at the local offices of the Soil Conservation Service.

Soil drainage is the major management need on about 16 percent of the acreage used for crops and pasture in the survey area. Some soils are naturally so wet that the production of crops common to the area generally is not possible without artificial drainage. These soils include the poorly drained and very poorly drained Comfrey, Drummer, Marshan, Millington, Sable, Sawmill, Selma, and Will soils, which make up about 76,784 acres in the survey area. Other soils that require artificial drainage are the organic Adrian, Houghton, and Palms soils, which make up about 3,557 acres of the survey area.

Unless they are artificially drained, soils that are somewhat poorly drained are so wet that crops are damaged in most years. The somewhat poorly drained soils are the Atterberry, Beardstown, Elburn, Elliott, Hayfield, Herbert, Hoopeston, Kane, Kendall, La Hogue, Lawson, Lisbon, Muscatine, Odell, Orion, and Stronghurst soils, which make up about 67,359 acres of the survey area.

Assumption and Elco soils have good natural drainage throughout most of the year, but they tend to be seepy after a heavy rain. Small areas of wetter soils along drainageways and in swales are commonly included in areas of the well drained or moderately well drained Downs, Fayette, Flagg, Jasper, Ogle, Parr, Plano, Tama, and Varna soils, that have slopes of 2 to 5 percent or 2 to 6 percent. Artificial drainage is needed in some areas of these wetter soils.

The design of surface and subsurface drainage systems is determined by the kind of soil. A combination of surface drainage and tile drainage is needed in most areas of the poorly drained soils that are used for intensive row cropping. Tile drains need to be spaced more closely in the more slowly permeable soils than in the more rapidly permeable soils. Most of the soils in the survey area have permeability that is rapid enough for tile drains to function properly. Locating adequate outlets for tile drainage systems is difficult in many areas of Comfrey, Marshan, Millington, Sawmill, and Will soils.

Organic soils oxidize and subside when the pore space is filled with air; therefore, a special drainage system is needed to control the depth and the period of drainage. During the growing season, the water table needs to be maintained at the level required by crops, and at other times it needs to be raised to the surface to minimize oxidation and subsidence.

Information on the design of a drainage system for each kind of soil is provided in the Technical Guide, which is available at the local offices of the Soil Conservation Service.

Soil fertility is naturally moderate to high in most upland soils in the survey area. The soils on flood plains, including Comfrey, Lawson, Millington, Orion, and Sawmill soils, range from slightly acid to moderately alkaline and are naturally higher in the content of plant nutrients than most upland soils.

The organic Adrian, Houghton, and Palms soils are strongly acid to mildly alkaline.

Many upland soils are naturally slightly acid or medium acid in the surface layer. If these soils have never been limed, ground limestone needs to be applied to raise the pH to a level sufficient for good growth of alfalfa and other crops. The content of available phosphorus and potassium is naturally medium to high in most upland soils.

For all the soils, the addition of lime and fertilizer should be based on the results of soil tests, on the need of the crop, and on the expected level of yield. The Cooperative Extension Service can help to determine the kind and amount of fertilizer and lime to apply.

Soil tilth is an important factor in the germination of seeds and in the infiltration of water into the soil. Soils that have good tilth are granular and porous.

Most of the soils that are used for crops have a silt loam or loam surface layer that is dark or moderately dark and has a moderate or high content of organic matter. In general, the structure of these soils is moderate, and if all crop residue is removed, intense rainfall can cause the formation of a crust on the surface. This crust is hard and nearly impervious to water when the soil is dry. If a crust forms, water infiltration is reduced, and runoff increases. The regular addition of crop residue, manure, or other organic material can help to improve soil structure and to reduce crust formation. Conservation tillage methods such as no-till or chisel planting can improve soil structure and prevent or reduce crust formation.

Moldboard plowing in fall generally is not effective on the light-colored silt loam soils in the survey area because a crust forms on the surface of these soils in winter and spring. If fall moldboard plowing is used, many of these soils are nearly as dense and hard at planting time as they were before being plowed. In addition, about 57 percent of the acreage in cropland consists of sloping soils that are subject to severe erosion if they are moldboard plowed in fall. The use of fall contourchisel plowing, which leaves 70 percent or more of the crop residue on the soil surface, is feasible.

The dark-colored Sable and Sawmill soils have a considerable content of clay and commonly remain wet until late in spring. If these soils are plowed when wet, they tend to be very cloddy when they dry, making a good seedbed difficult to prepare. Plowing these soils in fall generally results in good soil tilth in spring; chisel plowing generally is as effective as moldboard plowing.

Many *field crops* that are suited to the soils and climate in the survey area are not now commonly grown. Corn and soybeans are the major row crops. Grain sorghum, sunflowers, and similar crops can be grown if economic conditions are favorable.

Wheat and oats are the common close-growing crops. Rye, barley, buckwheat, and flax can be grown, and seed can be produced from bromegrass, fescue, bluegrass, red clover, crownvetch, and many of the other cool-season grasses and legumes.

Specialty crops that are grown commercially in the survey area include vegetables such as peas and sweetcorn and some small fruits, tree fruits, and nursery plants. Soils that have a high organic matter content are suited to crops such as lettuce, cabbage, potatoes, tomatoes, and other vegetables. In some small areas, the soils are used for melons, strawberries, raspberries, celery, tomatoes, peppers, and other vegetables and small fruits. In some large areas, the soils can be adapted to other specialty crops such as grapes and to many vegetables. Apples and cherries are the most common tree fruits.

Deep soils that have good natural drainage and that warm up early in spring are especially well suited to many vegetables and small fruits. Some of these soils are the Downs, Friesland, Jasper, Ogle, Parr, Plano, and Tama soils that have slopes of less than 6 percent, which make up about 85,522 acres of the survey area. If they are irrigated, the Billett, Chelsea, Flagler, and Hononegah soils that have slopes of less than 7 percent, which make up about 16,096 acres in the survey area, are very well suited to vegetables and small fruits. Crops can generally be planted and harvested earlier on all of these soils than on the other soils in the survey area.

If they are adequately drained, the muck soils in the county are well suited to many vegetable crops. Adrian, Houghton, and Palms soils make up about 3,557 acres in the survey area.

Most of the well drained soils in the survey area are suited to orchard and nursery plants. However, soils in low positions on the landscape, where frost is frequent and air drainage is poor, generally are poorly suited to early-planted vegetables, small fruits, and orchard plants.

The latest information and suggestions for growing specialty crops can be obtained at the local offices of the Cooperative Extension Service and the Soil Conservation Service.

Yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction

and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green-manure crops; and harvesting that insures the smallest possible loss.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils.

Land capability classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops (*6*). Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have slight limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in the section "Soil maps for detailed planning."

Woodland management and productivity

Woodland makes up 15,500 acres, or 4.7 percent of Winnebago County and 3,100 acres, or 1.7 percent, of Boone County. The principal forest-cover types in these counties, as defined by the Society of American Foresters, are: Northern red oak-basswood-white ash, white oak-red oak-hickory, white oak, and silver maple-American elm. These cover types include commercial tree species other than the ones listed.

There are more than ten sawmills in the two-county area; only four of these are in continuous operation. The survey area has an excellent potential for wood crops; however, only 21 percent of the acreage in woodland is receiving proper timber management. And in many areas, the soils in capability classes VI and VII are nonproductive in their present use, and they can be used as woodland.

Table 6 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The

second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *w* indicates excessive water in or on the soil; *d*, restricted root depth; *s*, sandy texture; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: w, d, s, and r.

In table 6, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *windthrow hazard* are based on soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that a few trees may be blown down by normal winds; *moderate*, that some trees will be blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blow down during periods of excessive soil wetness and moderate or strong winds.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

Windbreaks and environmental plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, hold snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To insure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 7 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 7 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Soil Conservation Service or the Cooperative Extension Service or from a nursery.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were

not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility (fig. 9), permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems,

Figure 9.—Severe erosion on an unprotected construction site on Ogle silt loam.

ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building site development

Table 8 shows the degree and kind of soil limitations that affect shallow excavations, dwellings without a basement and dwellings with a basement, small commercial buildings, and local roads and streets. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Sanitary facilities

Table 9 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 9 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if

slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to effectively filter the effluent. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 9 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 9 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper tranches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction materials

Table 10 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering properties and classifications provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable

material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction (fig. 10). Specifications for each use vary widely. In table 10, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering properties and classification.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water management

Table 11 gives information on the soil properties and site features that affect water management. The soil limitations are given for pond reservoir areas and embankments, dikes, and levees. This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. This table gives limitations, if any, that restrict the use of the soil as a source of material for embankment fill. The limitations apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The limitations do not relate to the ability of the natural soil to support an embankment. Soil properties, to a depth even greater than the height of the embankment, can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of

Figure 10.—A large sand and gravel pit in the Flagler-Warsaw-Hononegah map unit.

organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in table 11.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Recreation

The soils of the survey area are rated in table 12 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality (fig. 11), vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 12, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 12 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 9 and interpretations for dwellings without basements and for local roads and streets in table 8.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking, horseback riding, and bicycling should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Wildlife habitat

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect

Figure 11.—Recreation and camping area adjacent to a lake in the Flagg-Pecatonica map unit.

the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 13, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are orchardgrass, bluegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and ragweed.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, ash, cherry, black walnut, apple, hawthorn, dogwood, hickory, blackberry, and sumac. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and honeysuckle.

Coniferous plants furnish browse, seeds, and cones. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, white-cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, pondweed, cattail, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include warblers, ruffed grouse, woodcock, thrushes, woodpeckers, deer mice, squirrels, gray fox, raccoon, white-tailed deer, and chipmunk.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

The habitat elements needed for a specific species of wildlife generally require several kinds of soil and a combination of land uses. For this reason, interpretations of the soils in the survey area for use as wildlife habitat can best be related to the map units described in the section, "General soil map for broad land use planning."

In the following paragraphs, the general soil map units in Winnebago and Boone Counties are described as wildlife areas that differ in potential, wildlife species, and environment.

Wildlife area 1. This wildlife area is in the Tama-Ogle-Plano, Varna-Andres, Parr-Drummer, Flagg-Pecatonica, Miami-Kendall, and Griswold-Winnebago map units. The soils in this area are nearly level to strongly sloping and range from well drained to poorly drained.

Wildlife area 1 consists mainly of cropland, much of which is used for the continuous row cropping of corn and soybeans. Many of the soils are plowed in fall. Wildlife habitat in this area generally is poor because the amount of crop residue, herbaceous nesting and roosting cover, woody cover, and travel lanes or hedgerows is inadequate. Wildlife in this area consists mainly of ring-necked pheasant, raccoon, deer, and nongame species such as horned lark, dickcissel, meadow lark, grasshopper sparrow, fox snake, and other openland species.

Delaying mowing of grassy cover on roadsides and in ditchbanks and waterways until after the nesting season, protecting the existing woody cover, and returning crop residue to the soil can help to improve the wildlife habitat in this area.

Wildlife area 2. This wildlife area is in the Edmund-Chelsea-Winnebago, Ashdale-Rockton-Dodgeville, Fayette-Palsgrove, Whalan-NewGlarus-Dunbarton, and Flagler-Warsaw-Hononegah map units. The soils in this area are nearly level to moderately steep and range from moderately well drained to excessively drained.

The major land uses in this area are cropland, pastureland and hayland, and woodland. Because of the diversity of land uses, this area provides habitat for a wide variety of wildlife. The major game species are ring-necked pheasant, white-tailed deer, fox, and gray squirrels, mourning dove, and rabbit. Other wildlife in this area includes bobwhite quail, fox, raccoon, skunk, and other furbearers and nongame birds and mammals.

Protecting the woodlands from fire and grazing, properly managing pastureland, and returning crop residue to the soil can help to maintain or improve the wildlife habitat in this area.

Wildlife area 3. This wildlife area is in the Comfrey-Selma map unit, which is mainly on flood plains and low terraces bordering the Rock, Pecatonica, and Kishwaukee Rivers. The soils in this area are nearly level and poorly drained. In some areas, they are subject to flooding.

The major land uses in this area are cropland, pastureland, and woodland. Woodland areas provide habitat for white-tailed deer and other woodland wildlife. In some areas, these soils provide habitat for waterfowl, shore birds, wading birds, songbirds, and other wetland wildlife. Cropland that is flooded is used as feeding areas by ducks and geese.

Preserving the existing wetland and woodland areas and protecting them from livestock, returning crop residue to the soil, and properly managing pastureland can help to maintain or improve the wildlife habitat in this area.

Soil properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 17.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering properties

Table 14 gives estimates of the engineering classification and of the range of properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil series and morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains particles coarser than sand, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as Pt. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 17.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard

Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and chemical properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Soil and water features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt and water in swamps and marshes is not considered flooding.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An artesian water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A perched water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavations.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Engineering test data

Table 17 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are typical of the series and are described in the section "Soil series and morphology." The soil samples were tested by the Illinois State Department of Transportation.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are: AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM); and Moisture density, Method A—T 99 (AASHTO), D 698 (ASTM).

Classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*7*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. In table 18, the soils of the survey area are classified according to the system. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Mollisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquoll (*Aqu*, meaning water, plus *oll*, from Mollisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplaquolls (*Hapl*, meaning minimal horizonation, plus *aquoll*, the suborder of the Mollisols that have an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Haplaquolls.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-silty, mixed, nonacid, mesic Typic Haplaquolls.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil series and morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*5*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*7*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Soil maps for detailed planning."

Adrian series

The Adrian series consists of deep, very poorly drained soils that formed in decomposed organic sediment and the underlying sandy sediment. Adrian soils

are in low areas on flood plains. The slope is 0 to 2 percent. Permeability is moderately rapid in the upper part of the pedon and rapid in the lower part.

Adrian soils are similar to Palms soils, and they are near Comfrey soils. Unlike Adrian soils, Palms soils are loamy at a depth of 16 to 50 inches, and Comfrey soils do not have an organic horizon.

Typical pedon of Adrian muck, 640 feet north and 2,180 feet west of the southeast corner of sec. 12, T. 43 N., R. 2 E.

Oap—0 to 7 inches; black (N 2/0) broken face, black (5Y 2/1) rubbed sapric material that is about 5 percent sand; about 5 percent fiber, no fiber rubbed; weak fine subangular blocky structure; friable; many fine roots; neutral; abrupt smooth boundary.

Oa2—7 to 13 inches; black (N 2/0) broken face, black (5Y 2/1) rubbed sapric material that is about 5 percent sand; about 10 percent fiber, less than 5 percent rubbed; weak thin platy structure and weak medium angular blocky; friable; many fine roots; mostly herbaceous fiber; neutral; clear smooth boundary.

Oa3—13 to 20 inches; black (N 2/0) broken face, black (5Y 2/1) rubbed sapric material that is about 20 percent bleached sand grains; about 30 percent fiber, less than 5 percent rubbed; weak coarse angular blocky structure; friable; many fine roots; mostly herbaceous fiber; neutral; clear smooth boundary.

Oa4—20 to 25 inches; black (5Y 2/1) broken face and rubbed sapric material that is about 20 percent bleached sand grains; about 60 percent fiber, less than 5 percent rubbed; weak coarse prismatic structure; friable; many fine roots; mostly herbaceous fiber; neutral; clear smooth boundary.

Oe1—25 to 32 inches; very dark grayish brown (2.5Y 3/2) broken face, black (5Y 2/1) rubbed hemic material that is about 10 percent sand; about 90 percent fiber, less than 20 percent rubbed; weak coarse prismatic structure; friable; neutral; abrupt smooth boundary.

IICg—32 to 60 inches; grayish brown (2.5Y 5/2) loamy sand that has common medium strong brown (7.5YR 5/8) mottles; single grained; loose; neutral in upper part; strong effervescence with depth; moderately alkaline.

The thickness of the solum and the depth to the sandy IIC horizon range from 16 to 50 inches.

The color of the surface tier has hue of 10YR or 5Y, or the hue is neutral. In some pedons, broken face, rubbed, and pressed colors range 1 or 2 units in value or chroma or both. The color of the tier has hue of 10YR, 7.5YR, 5Y, 5YR, or 2.5Y, or the hue is neutral; value is 2 or 3; and chroma is 0 through 3. The IIC horizon ranges in texture from sand to gravelly loamy sand. Its color has hue of 10YR or 2.5Y.

Andres series

The Andres series consists of deep, somewhat poorly drained soils that formed in loess and the underlying calcareous silty clay loam glacial till. Andres soils are on upland divides and uneven foot slopes. The slope is 0 to 3 percent. Permeability is moderate in the upper part of the pedon and moderately slow in the lower part.

Andres soils are similar to Elliott and La Hogue soils, and they are near Varna and Selma soils. Elliott soils have a thinner solum than Andres soils. Unlike Andres soils, La Hogue soils formed in glacial outwash. Andres soils are not so well drained as Varna soils. They are better drained than Selma soils.

Typical pedon of Andres silt loam, 300 feet south and 2,070 feet west of the northeast corner of sec. 35, T. 43 N., R. 2 E.

Ap—0 to 9 inches; black (10YR 2/1) silt loam; moderate fine granular structure; friable; many fine roots; mildly alkaline; abrupt smooth boundary.

A12—9 to 17 inches; very dark gray (10YR 3/1) silty clay loam; moderate medium granular structure; friable; many fine roots; neutral; clear smooth boundary.

B21t—17 to 27 inches; grayish brown (10YR 5/2) silty clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common fine roots; many thin dark grayish brown (10YR 4/2) clay films on faces of peds; few pebbles; neutral; clear smooth boundary.

IIB22t—27 to 36 inches; mixed grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) clay loam; weak coarse prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; many thin grayish brown (10YR 5/2) clay films on faces of peds; many pebbles and rocks; mildly alkaline; clear smooth boundary.

IIIB3—36 to 50 inches; mixed light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) silty clay loam; weak coarse prismatic structure; firm; few fine roots; many thin light brownish gray (2.5Y 6/2) clay films on faces of peds; few to common pebbles; mildly alkaline; clear smooth boundary.

IIIC—50 to 70 inches; mixed light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) silty clay loam; massive; firm; few fine roots; strong effervescence; moderately alkaline.

The solum is 36 to 60 inches thick. A thin layer of loess or silty material as much as 24 inches thick overlies the till. The depth to carbonates is 30 to 50 inches.

The A horizon is loam, silt loam, or silty clay loam. Its color has hue of 10YR, value of 2 or 3, and chroma of 1

or 2. The IIB and IIIB horizons are clay loam, silty clay loam, or sandy clay loam. Their color has hue of 10YR, value of 4 through 6, and chroma of 2 through 6. The color of the IIIC horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 through 6.

Argyle series

The Argyle series consists of deep, well drained, moderately permeable soils that formed in loess and the underlying loamy glacial drift. Argyle soils are on convex ridgetops and long upland side slopes. The slope ranges from 2 to 6 percent.

Argyle soils are similar to Ogle soils, and they are near Whalan, NewGlarus, Rockton, and Dodgeville soils. Ogle soils have a thicker loess mantle than Argyle soils. Unlike Argyle soils, Whalan, NewGlarus, Rockton, and Dodgeville soils have bedrock within a depth of 20 to 40 inches. In addition, Whalan and NewGlarus soils have a lighter colored surface layer than Argyle soils.

Typical pedon of Argyle silt loam, 2 to 6 percent slopes, 54 feet north and 54 feet west of the southeast corner of sec. 36, T. 26 N., R. 10 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam; moderate medium granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

B1—8 to 11 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; common fine roots; very dark grayish brown (10YR 3/2) coatings; neutral; abrupt smooth boundary.

B21t—11 to 24 inches; dark yellowish brown (10YR 4/4) silty clay loam; strong fine and very fine subangular blocky structure; friable; common fine roots; continuous thin dark yellowish brown (10YR 3/4) clay films on faces of peds; medium acid; clear smooth boundary.

IIB22t—24 to 29 inches; dark yellowish brown (10YR 4/4) light clay loam; moderate medium subangular blocky structure; friable; few fine roots; common thin dark yellowish brown (10YR 3/4) clay films on faces of peds; few medium dark reddish gray (5YR 4/2) coatings on faces of peds; common pebbles that are 5 to 20 mm in diameter; strongly acid; clear smooth boundary.

IIB23t—29 to 45 inches; yellowish red (5YR 5/6) clay loam; few medium distinct strong brown (7.5YR 5/6) mottles; weak medium prismatic structure parting to moderate medium and coarse subangular blocky; friable; few fine roots; nearly continuous thin yellowish red (5YR 4/6) clay films on faces of peds; common moderately thick very pale brown (10YR 7/4) uncoated silt and sand grains on faces of peds in the upper 4 inches; few black (10YR 2/1) fillings in pores; common pebbles, 1 to 3 cm in diameter; medium acid; clear smooth boundary.

IIB24t—45 to 62 inches; mixed strong brown (7.5YR 5/6) and reddish brown (5YR 4/4) clay loam; weak coarse prismatic structure parting to weak medium subangular blocky; friable; patchy yellowish red (5YR 4/6) clay films on faces of peds; few black (10YR 2/1) fillings in pores; common pebbles, 5 to 20 mm in diameter and few pebbles, 2 to 5 cm in diameter; medium acid.

The solum is 4 to 8 feet or more thick.

The color of the surface layer has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The upper part of the B horizon is light to medium silty clay loam. The IIB horizon ranges in texture from clay loam to gravelly sandy clay loam or sandy loam. Its color has hue of 10YR, 7.5YR, or 5YR; value of 4 or 5; and chroma of 4 through 6.

Ashdale series

The Ashdale series consists of deep, well drained soils that formed in loess and the underlying material that weathered from dolomite bedrock. Ashdale soils are on convex ridgetops, knolls, and uneven side slopes on glaciated uplands. The slope ranges from 2 to 9 percent. Permeability is moderate in the upper part of the pedon and slow in the lower part.

Ashdale soils are similar to Dodgeville soils. They are in the same landscape positions as the well drained Tama, Ogle, and Plano soils. Dodgeville soils have a thinner solum and are shallower to dolomite than Ashdale soils. Tama soils formed entirely in loess or colluvial silt. Plano soils formed in glacial outwash and do not have dolomite. Unlike Ashdale soils, Ogle soils have reddish-colored glacial drift in the lower part of the solum.

Typical pedon of Ashdale silt loam, 2 to 5 percent slopes, 540 feet south and 1,275 feet east of the northwest corner of sec. 32, T. 26 N., R. 10 E.

Ap—0 to 9 inches; very dark brown (10YR 2/2) silt loam; moderate medium granular structure; very friable; many medium roots; neutral; clear smooth boundary.

A3—9 to 14 inches; dark brown (10YR 3/3) silt loam; moderate medium granular structure; friable; common fine roots; slightly acid; clear smooth boundary.

B21t—14 to 19 inches; brown (10YR 4/3) silty clay loam; moderate fine and medium subangular blocky structure; friable; common fine roots; slightly acid; clear smooth boundary.

B22t—19 to 30 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; friable; common fine roots; few thin dark grayish brown (10YR 4/2) clay films and few light gray (10YR 7/1, dry) uncoated silt and sand grains

on faces of peds; medium acid; gradual smooth boundary.

B23t—30 to 41 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; thin brown (10YR 5/2) clay films and few light gray (10YR 7/1, dry) uncoated silt and sand grains on faces of peds; many small chert pebbles, 1 to 3 mm in diameter; slightly acid; clear smooth boundary.

IIB24t—41 to 45 inches; mixed dark reddish brown (5YR 3/4) and dark brown (10YR 3/3) silty clay; massive; firm; few fine roots; slightly acid; abrupt smooth boundary.

IIR—45 inches; fractured dolomite bedrock.

The solum is 40 to 60 inches thick. The depth to bedrock is 42 to 60 inches. The thickness of the loess is 36 to 50 inches. The IIB horizon is 1 to 12 inches thick. The dolomite bedrock commonly is fractured in the upper part and is more consolidated with depth.

The color of the A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. The color of the B horizon has hue of 10YR, value of 4 or 5, and chroma of 3 through 5. The IIB horizon is silty clay or clay. Its color has hue of 10YR, 7.5YR, or 5YR, value of 3 through 5, and chroma of 3 through 5.

Assumption series

The Assumption series consists of deep, moderately well drained soils that formed in loess over a paleosol that formed in glacial drift. Assumption soils are on benches and on side slopes of drainageways on glaciated uplands. The slope ranges from 2 to 6 percent. Permeability is moderate in the upper part of the pedon and moderately slow in the lower part.

Assumption soils are similar to Ogle soils. They are in the same landscape positions as the well drained Tama and Plano soils. Unlike Assumption soils, Ogle soils have a reddish-colored paleosol. Tama soils formed entirely in loess or colluvial silt. Plano soils formed in loess and glacial outwash.

Typical pedon of Assumption silt loam, 2 to 6 percent slopes, eroded, 1,265 feet north and 70 feet east of the southwest corner of sec. 31, T. 26 N., R. 10 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) heavy silt loam; few medium faint brown to dark brown (10YR 4/3) mottles; moderate fine and medium granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

B21t—8 to 12 inches; brown (10YR 4/3) silty clay loam; moderate medium subangular blocky structure; friable; common fine roots; few thin very dark gray (10YR 3/1) organic coatings; neutral; clear smooth boundary.

B22t—12 to 21 inches; brown (10YR 4/3) silty clay loam; common medium distinct light brownish gray (10YR 6/2) mottles; weak moderate prismatic structure parting to moderate medium subangular blocky; friable; common fine roots; few thin brown (10YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.

B3—21 to 28 inches; brown (10YR 4/3) silt loam; common medium distinct light grayish brown (10YR 6/2) mottles; moderate medium and coarse subangular blocky structure; friable to firm; common fine roots; many thin brown (7.5YR 4/4) clay films on faces of peds; slightly acid; abrupt smooth boundary.

IIA11gb—28 to 33 inches; grayish brown (10YR 5/2) loam; common fine prominent light olive brown (2.5YR 5/4) mottles; moderate coarse prismatic structure; friable to firm; common fine roots; slightly acid; clear smooth boundary.

IIA12gb—33 to 41 inches; very dark grayish brown (2.5YR 3/2) loam; few medium faint light grayish brown (2.5YR 6/2) mottles; moderate medium to coarse prismatic structure parting to moderate medium angular blocky; firm; few fine roots; neutral; abrupt smooth boundary.

IIA2gb—41 to 49 inches; grayish brown (2.5YR 5/2) and light brownish gray (2.5YR 6/2) loam; moderate medium and coarse platy structure; friable; white (10YR 8/1, dry) uncoated silt and sand grains and continuous thin grayish brown (2.5YR 5/2) clay films on faces of peds; neutral; clear smooth boundary.

IIBgb—49 to 60 inches; light brownish gray (2.5YR 6/2) clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; moderate fine and medium angular blocky structure; firm; continuous thin grayish brown (2.5YR 5/2) clay films on faces of peds; slightly acid.

The solum is 48 to more than 72 inches thick. The thickness of silty material over the paleosol is 20 to 40 inches.

The color of the Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. The B horizon is silt loam or silty clay loam. Its color has hue of 10YR and value and chroma of 3 through 5. The paleosol typically is loam or clay loam. Its color has hue of 5Y to 10YR, value of 3 through 6, and chroma of 1 or 2.

Atterberry series

The Atterberry series consists of deep, somewhat poorly drained, moderately permeable soils that formed in loess that is more than 60 inches thick. Atterberry soils are on broad stream terraces and in drainageways on upland plains. The slope is 0 to 3 percent.

Atterberry soils are similar to Muscatine soils, and they are near Downs and Fayette soils. Muscatine soils have a thicker surface horizon than Atterberry soils; and

Downs and Fayette soils are better drained. In addition, Fayette soils have a lighter colored surface horizon than Atterberry soils.

Typical pedon of Atterberry silt loam, 330 feet north and 275 feet west of the southeast corner of sec. 11, T. 28 N., R. 10 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam; weak medium platy structure parting to moderate fine granular; friable; many fine roots; slightly acid; abrupt smooth boundary.

A2—9 to 14 inches; brown (10YR 5/3) silt loam, very dark grayish brown (10YR 3/2) in places; few fine faint dark yellowish brown (10YR 4/4) mottles; moderate thick platy structure; friable; common fine roots; slightly acid; clear smooth boundary.

B1—14 to 17 inches; dark grayish brown (2.5Y 4/2) heavy silt loam; few fine faint yellowish brown (10YR 5/4) mottles; moderate very fine subangular blocky structure; friable; common fine roots; thin continuous dark grayish brown (10YR 4/2) clay films and few light gray (10YR 7/1) uncoated silt and sand grains on faces of peds; medium acid; clear smooth boundary.

B21—17 to 24 inches; brown (10YR 4/3) silty clay loam, few fine distinct strong brown (7.5YR 5/6 to 5/8) mottles; moderate fine subangular blocky structure; firm; common fine roots; thin discontinuous grayish brown (2.5Y 5/2) clay films and few light gray (10YR 7/1) uncoated silt and sand grains on faces of peds; few fine and very fine iron-manganese concretions; medium acid; gradual smooth boundary.

B22t—24 to 34 inches; mixed grayish brown (2.5Y 5/2) and light olive brown (2.5Y 5/4) silty clay loam; common fine prominent strong brown (7.5YR 5/6 to 5/8) mottles; moderate medium prismatic structure parting to moderate coarse subangular blocky; slightly firm; few fine roots; thin discontinuous grayish brown (2.5Y 5/2) clay films on vertical faces of peds; few fine and very fine iron-manganese concretions; strongly acid; gradual wavy boundary.

B31—34 to 44 inches; mixed grayish brown (2.5Y 5/2) and light olive brown (2.5Y 5/4) silt loam; common fine prominent strong brown (7.5YR 5/6 to 5/8) mottles; moderate coarse prismatic structure; friable; thin discontinuous light olive brown (2.5Y 5/4) clay films on vertical faces of peds; few very dark gray (10YR 3/1) fillings in worm channels; common fine iron-manganese concretions; strongly acid; gradual irregular boundary.

B32—44 to 60 inches; mixed light brownish gray (2.5Y 6/2) and light olive brown (2.5Y 5/4) silt loam; many medium prominent strong brown (7.5YR 5/6 to 5/8) mottles; moderate very coarse prismatic structure; friable; thick discontinuous very dark brown (10YR 2/2) coatings; common fine iron-manganese concretions; neutral; gradual irregular boundary.

The solum is 42 to more than 60 inches thick.

The color of the Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The color of the A2 horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The B horizon is heavy silt loam or light silty clay loam. Its color has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 through 4.

Backbone series

The Backbone series consists of moderately deep, well drained soils that formed in sand and the underlying glacial drift. Backbone soils are underlain by dolomite. They are on convex ridgetops and uneven convex side slopes, mainly on glaciated uplands. The slope ranges from 2 to 15 percent. Permeability is moderately rapid in the upper part of the pedon and moderate in the lower part.

Backbone soils are similar to Billett soils, and they are near Chelsea soils. Unlike Backbone soils, the well drained Billett soils formed entirely in sandy loam and loamy sand. Backbone soils are not so sandy as the excessively drained Chelsea soils, which are in slightly higher, dunal areas.

Typical pedon of Backbone loamy sand, 5 to 9 percent slopes, 1,360 feet south and 220 feet west of the center of sec. 26, T. 29 N., R. 11 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) loamy sand; moderate fine and medium granular structure; friable; many fine roots; many light gray (10YR 7/1) uncoated silt and sand grains; neutral; abrupt smooth boundary.

A2—8 to 11 inches; brown (10YR 4/3) and dark grayish brown (10YR 4/2) loamy sand; moderate medium platy structure; friable; common fine roots; neutral; clear smooth boundary.

B1—11 to 17 inches; brown (7.5YR 4/4) sandy loam; moderate fine and medium subangular blocky structure; friable; few fine roots; neutral; gradual smooth boundary.

IIB2t—17 to 25 inches; reddish brown (5YR 4/4) loam; weak medium subangular blocky structure; friable; few fine roots; many thin reddish brown (5YR 4/3) clay films on faces of peds; neutral; abrupt smooth boundary.

IIIR—25 inches; dolomite bedrock that is fractured in the upper 6 inches.

The thickness of the solum and the depth to bedrock are 20 to 40 inches. The glacial drift is 1 to 10 inches thick. The dolomite bedrock commonly is fractured in the upper part and is more consolidated with depth.

The Ap horizon is loamy sand or sandy loam. Its color has hue of 10YR, value of 2, and chroma of 1 or 2. The A2 horizon, if present, is loamy sand or sandy loam. Its color has hue of 10YR, value of 4 or 5, chroma of 2 or 3.

The B horizon is sandy loam or loam. Its color has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 3 or 4. The IIB horizon is sandy loam, sandy clay loam, loam, or clay loam. Its color has hue of 10YR, 7.5YR, or 5YR; and value and chroma of 3 through 5.

Beardstown series

The Beardstown series consists of deep, somewhat poorly drained soils that formed in stratified sandy and loamy sediment. Beardstown soils are on outwash plains and stream terraces. The slope is 0 to 3 percent. Permeability is moderately slow in the upper part of the pedon and moderately rapid in the lower part.

Beardstown soils are similar to La Hogue, Virgil, and Atterberry soils, and they are near Martinsville soils. La Hogue soils have a thicker and darker colored surface layer than Beardstown soils. Virgil and Atterberry soils have less sand in the solum than Beardstown soils. Beardstown soils are more poorly drained than Martinsville soils.

Typical pedon of Beardstown loam, 2,540 feet north and 1,260 feet east of the southwest corner of sec. 24, T. 28 N., R. 1 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) loam; moderate fine granular structure; friable; common fine roots; medium acid; abrupt smooth boundary.

A2—8 to 13 inches; grayish brown (10YR 5/2) loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate thick platy structure; friable; few fine roots; medium acid; abrupt smooth boundary.

B21t—13 to 23 inches; grayish brown (10YR 5/2) sandy clay loam; many fine distinct yellowish brown (10YR 5/6) and brown (7.5YR 4/2) mottles; moderate fine subangular blocky structure; friable; few fine roots; strongly acid; abrupt smooth boundary.

B22t—23 to 26 inches; brown (10YR 5/3) sandy clay loam; common fine distinct dark grayish brown (10YR 4/2) mottles; moderate fine subangular blocky structure; friable; few fine roots; strongly acid; abrupt smooth boundary.

B23t—26 to 29 inches; grayish brown (10YR 5/2) sandy clay loam; common fine faint brown (10YR 4/3) and common fine distinct reddish brown (5YR 4/4) mottles; moderate fine subangular blocky structure; friable; few fine roots; strongly acid; abrupt smooth boundary.

B24—29 to 34 inches; grayish brown (10YR 5/2) light sandy clay loam; common fine prominent yellowish red (5YR 4/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; medium acid; abrupt smooth boundary.

B31—34 to 38 inches; dark yellowish brown (10YR 4/4) sandy loam; common fine distinct dark grayish brown (10YR 4/2) mottles; weak medium subangular blocky structure; friable; few fine roots; neutral; abrupt smooth boundary.

B32—38 to 44 inches; dark grayish brown (10YR 4/2) sandy loam; common fine distinct dark yellowish brown (10YR 4/4) mottles; moderate medium prismatic structure; friable; few fine roots; strongly acid; abrupt smooth boundary.

C—44 to 60 inches; stratified dark yellowish brown (10YR 4/4) and brown (10YR 5/3) loamy sand, sandy loam, and loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate and medium subangular blocky; friable to loose; slightly acid to neutral.

The solum is 36 to 60 inches thick.

The Ap and A2 horizons are loam or silt loam. The color of the Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. The color of the A2 horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. The color of the B horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 through 4. The C horizon ranges from loam to loamy sand and commonly is stratified.

Billett series

The Billett series consists of deep, well drained soils that formed in loamy and sandy material. Billett soils are on dunal ridges on upland drainage divides and on broad terraces. The slope ranges from 0 to 6 percent but is mainly 2 to 6 percent. Permeability is moderately rapid in the upper part of the pedon and rapid in the lower part.

Billett soils are similar to Flagler soils, and they are near La Hogue and Hoopeston soils. Flagler soils have a thicker surface layer than Billett soils. La Hogue soils have less sand. Billett soils are better drained than La Hogue and Hoopeston soils.

Typical pedon of Billett sandy loam, 0 to 2 percent slopes, 520 feet south and 1,840 feet west of the center of sec. 13, T. 43 N., R. 2 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) sandy loam; weak medium granular structure; very friable; many fine roots; medium acid; abrupt smooth boundary.

A2—8 to 13 inches; brown (10YR 4/3) sandy loam; weak medium subangular blocky structure; friable; few fine roots; medium acid; abrupt smooth boundary.

B21t—13 to 21 inches; dark yellowish brown (10YR 4/4) heavy sandy loam; weak coarse subangular blocky structure; friable; few fine roots; few thin very dark grayish brown (10YR 3/2) clay films and bridges; slightly acid; clear smooth boundary.

B22—21 to 28 inches; dark yellowish brown (10YR 4/4) sandy loam; weak coarse subangular blocky struc-

ture; friable; few fine roots; few thin very dark grayish brown (10YR 3/2) clay films and bridges; slightly acid; clear smooth boundary.

B23—28 to 41 inches; yellowish brown (10YR 5/4) loamy sand; very weak coarse prismatic structure; very friable; few fine roots; few dark brown (10YR 3/3) clay bridges; slightly acid; abrupt smooth boundary.

B31—41 to 47 inches; mixed brown (10YR 4/3) and dark yellowish brown (10YR 4/4) heavy sandy loam; weak medium subangular blocky structure; friable; few fine roots; few thin very dark grayish brown (10YR 3/2) clay films; few fine pebbles; slightly acid; abrupt smooth boundary.

C1—47 to 52 inches; dark yellowish brown (10YR 4/4) loamy sand; single grained; loose; few fine roots; common fine gravel; slightly acid; abrupt smooth boundary.

C2—52 to 60 inches; dark yellowish brown (10YR 4/4) gravelly loamy sand; single grained; loose; slightly acid.

The solum is 30 to more than 60 inches thick.

The color of the Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. The color of the A2 horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The B horizon is sandy loam or loamy sand. Its color has hue of 10YR or 7.5YR and value and chroma of 4 through 6. The C horizon is loamy sand or sand and gravel.

Chelsea series

The Chelsea series consists of deep, excessively drained, rapidly permeable soils that formed in windblown sandy material. Chelsea soils are on dunes on upland ridges and on stream terraces. The slope ranges from 2 to 12 percent.

Chelsea soils are similar to Hononegah soils, and they are near Backbone soils. Unlike Chelsea soils, Hononegah soils have a mollic epipedon and are underlain by gravel within a depth of 40 inches. Backbone soils are less sandy in the upper part of the pedon than Chelsea soils, and, unlike Chelsea soils, they are underlain by glacial drift and have fractured dolomite bedrock at a depth of less than 40 inches. In addition, Backbone soils have a darker A horizon.

Typical pedon of Chelsea loamy fine sand, 2 to 7 percent slopes, 700 feet south and 1,400 feet east of the northwest corner of sec. 4, T. 28 N., R. 11 E.

O1—1 1/2 inches to 0; forest mull, leaves, twigs, and roots; very friable; abrupt smooth boundary.

A1—0 to 4 inches; very dark grayish brown (10YR 3/2) loamy fine sand; weak fine granular structure; very friable; many fibrous roots; slightly acid; clear smooth boundary.

A21—4 to 16 inches; brown (7.5YR 5/4) loamy sand; weak medium subangular blocky structure; very friable; common fibrous and tap roots; continuous brown (10YR 4/3) clay films and bridges; very dark grayish brown (10YR 3/2) fillings in worm and root channels; slightly acid; clear wavy boundary.

A22—16 to 35 inches; yellowish brown (10YR 5/4) loamy fine sand; weak coarse subangular blocky structure; very friable; common tap roots; few brown (7.5YR 5/4) clay films and bridges; medium acid; clear wavy boundary.

A&B—35 to 60 inches; yellowish brown (10YR 6/4) sand (A); single grained; loose; bands of brown (7.5YR 4/4) loamy sand and fine sandy loam (B); weak medium subangular blocky structure; friable; bands total 5 inches in thickness; medium acid to strongly acid.

The solum is 48 inches to more than 60 inches thick.

The color of the A horizon in an uneroded soil has hue of 10YR, value of 3, and chroma of 1 or 2. The color of the very thin bands that make up the B part of the A&B horizon has hue of 7.5YR or 10YR and value and chroma of 3 or 4. The aggregate thickness of these bands, above a depth of 60 inches, is less than 6 inches. The color of the A part of the A&B horizon has hue of 10YR, value of 4 through 6, and chroma of 2 through 4.

Comfrey series

The Comfrey series consists of deep, poorly drained soils that formed in alluvium. Comfrey soils are on flood plains. The slope is 0 to 2 percent. Permeability is moderate in the subsoil and moderate to moderately rapid in the substratum.

Comfrey soils are similar to Selma and Marshan soils, and they are near Lawson, Orion, and Troxel soils. Selma and Marshan soils are in slightly higher positions on the landscape than Comfrey soils, and they have a dark A horizon that is less than 24 inches thick. Unlike Comfrey soils, Lawson and Orion soils are silty and are somewhat poorly drained. Orion soils have a light colored A horizon. Troxel soils are well drained and are at the upper end of drainageways.

Typical pedon of Comfrey loam, in a pasture 1,400 feet west and 580 feet north of the center of sec. 25, T. 43 N., R. 2 E.

A11—0 to 6 inches; black (10YR 2/1) loam; moderate fine granular structure; friable; many fine roots; neutral; clear smooth boundary.

A12—6 to 11 inches; black (N 2/0) light clay loam; moderate very fine subangular blocky structure; friable; many fine roots; neutral; clear smooth boundary.

A13—11 to 17 inches; black (10YR 2/1) clay loam; few fine distinct dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure; friable; many fine roots; many fine pores; neutral; clear smooth boundary.

A14—17 to 26 inches; very dark gray (10YR 3/1) light clay loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; friable; common fine roots; many fine pores; neutral; clear smooth boundary.

C1—26 to 40 inches; grayish brown (10YR 5/2) loam; common medium distinct yellowish brown (10YR 5/6) mottles; few very dark gray (10YR 3/1) fillings in root channels; massive; friable; few fine roots; neutral; abrupt smooth boundary.

C2—40 to 60 inches; mixed grayish brown (10YR 5/2) and gray (5Y 5/1) stratified loam, sandy loam, and loamy fine sand; common medium distinct yellowish brown (10YR 5/6 and 5/8) mottles; massive; slight effervescence; mildly alkaline.

The mollic epipedon is 24 to 36 inches thick. It typically is loam or clay loam, but the range includes silt loam or silty clay loam that is high in content of fine sand. The depth to free carbonates is 20 to 40 inches.

The color of the A horizon has hue of 10YR or neutral, value of 2 or 3, and chroma of 1. In the upper part, the C horizon commonly is loam, clay loam, or silt loam that is high in content of fine sand, and in the lower part it commonly is stratified loam, sandy loam, or loamy fine sand. The color of the C horizon has hue of 10YR, 2.5Y, or 5Y; value of 4 or 5; and chroma of 1 or 2.

Dakota series

The Dakota series consists of well drained soils that formed in silty and loamy sediment and the underlying sand and gravel. Dakota soils are on stream terraces. The slope is 0 to 3 percent. Permeability is moderate in the upper part of the pedon and rapid in the lower part.

Dakota soils are similar to Warsaw and Wea soils, and they are near Troxel and Jasper soils. Unlike Dakota soils, Warsaw soils have gravel above a depth of 40 inches. Wea soils have a thicker solum than Dakota soils. Jasper soils are not underlain by gravel and do not have contrasting textures above a depth of 40 inches. Troxel soils are in depressions and have a thicker mollic epipedon than Dakota soils.

Typical pedon of Dakota silt loam, 0 to 3 percent slopes, 810 feet north and 75 feet east of the southwest corner of sec. 5, T. 43 N., R. 3 E.

Ap—0 to 8 inches; black (10YR 2/1) silt loam; moderate medium granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

A12—8 to 13 inches; black (10YR 2/1) silt loam; moderate fine granular structure; friable; common fine roots; neutral; clear smooth boundary.

B1—13 to 19 inches; dark brown (10YR 4/3) silt loam; moderate medium subangular blocky structure; friable; few fine roots; continuous thin very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

B21t—19 to 24 inches; dark brown (10YR 4/3) silty clay loam; moderate fine prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; neutral; clear smooth boundary.

B22t—24 to 34 inches; dark brown (10YR 4/3) clay loam; moderate medium prismatic structure; friable; few fine roots; dark yellowish brown (10YR 4/4) matrix; dark brown (10YR 3/3) coatings and common pebbles, 1/2 to 2 cm in diameter, in lower 2 inches of horizon; neutral; abrupt smooth boundary.

IIB3—34 to 52 inches; dark yellowish brown (10YR 4/4) sand; single grained; friable; dark brown (10YR 3/3) coatings and few pebbles, 1/2 to 1 cm in diameter, in lower 2 inches of horizon; neutral; abrupt smooth boundary.

IIC—52 to 60 inches; pale brown (10YR 6/3) gravelly coarse sand; single grained; friable; many pebbles, 1 to 3 cm in diameter; slight effervescence; mildly alkaline.

The solum is 25 to more than 50 inches thick.

The Ap or A1 horizon is silt loam, but the range includes loam. Its color has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The color of the B horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2, 3, or 4. The B horizon ranges in texture from silt loam and silty clay loam to sandy clay loam. In most pedons, the upper part of the B horizon is silt loam or silty clay loam. The IIC horizon dominantly is gravelly coarse sand and sand. Its color has hue of 10YR; value of 4, 5, or 6; and chroma of 3 or 4.

Dodgeville series

The Dodgeville series consists of moderately deep, well drained soils that formed in a thin mantle of loess and the underlying clayey residuum of dolomite bedrock. Dodgeville soils are on upland crests and side slopes. They are mapped only with Rockton soils. The slope ranges from 1 to 15 percent. Permeability is moderate in the upper part of the pedon and moderately slow in the lower part.

Dodgeville soils are similar to Rockton and Ashdale soils, and they are near Winnebago and Argyle soils. Rockton soils have more sand in the solum than Dodgeville soils. Ashdale soils have a thicker component of loess and a thinner component of residuum in the profile, and they are deeper to dolomite bedrock than Dod-

geville soils. Unlike Dodgeville soils, Winnebago and Argyle soils formed in glacial drift and do not have dolomite bedrock within a depth of 60 inches.

Typical pedon of Dodgeville silt loam, in an area of Rockton and Dodgeville soils, 1 to 5 percent slopes, 201 feet north and 60 feet east of the southwest corner of sec. 18, T. 28 N., R. 10 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam; moderate medium granular structure; many fine roots; neutral; abrupt smooth boundary.

A12—8 to 12 inches; mixed dark brown (10YR 3/3) and very dark grayish brown (10YR 3/2) silt loam; moderate medium and very fine granular structure; friable; many fine roots; neutral; clear smooth boundary.

B21t—12 to 21 inches; brown (7.5YR 4/4) silty clay loam; moderate fine subangular blocky structure parting to moderate fine granular; friable; common fine roots; many thin dark brown (7.5YR 3/2) and brown (7.5YR 4/2) clay films on faces of peds; few chert pebbles, 5 mm in diameter; slightly acid; clear smooth boundary.

IIB22t—21 to 26 inches; dark reddish brown (5YR 3/4) heavy silty clay; moderate medium subangular blocky structure; firm; common fine roots; continuous thin dark reddish brown (10YR 3/3) clay films on faces of peds; few igneous pebbles, 1 to 5 mm in diameter, and common small chert pebbles, 1 to 5 mm in diameter; strongly acid; clear smooth boundary.

IIB23t—26 to 36 inches; dark reddish brown (5YR 3/4) clay; moderate medium prismatic structure parting to moderate medium and fine angular blocky; firm; common fine roots through vertical ped faces; continuous thin dark reddish brown (5YR 3/4) clay films on faces of peds; strongly acid; abrupt smooth boundary.

IIR—36 inches; fractured dolomite bedrock.

The solum is 20 to 40 inches thick. The loess is 15 to 30 inches thick, and the clayey residuum is 10 to 20 inches thick.

The color of the Ap or A12 horizon has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. The part of the B horizon that formed in loess is silty clay loam, and the part that formed in residuum is silty clay to clay. The color of the part of the B horizon that formed in loess has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 3 or 4; the color of the part that formed in residuum has hue of 7.5YR or 5YR and value and chroma of 3 through 5.

Downs series

The Downs series consists of deep, well drained, moderately permeable soils that formed in loess. Downs soils are on broad upland divides, ridges, and side slopes. The slope ranges from 0 to 6 percent but dominantly is 2 to 6 percent.

Downs soils are similar to Tama and Plano soils, and they are near Atterberry, Virgil, and Sable soils. Tama and Plano soils have a thicker A horizon than Downs soils. Plano soils are underlain by glacial outwash or glacial till. Downs soils are better drained than Atterberry soils. They are also better drained than Virgil soils, which formed in glacial outwash. Unlike Downs soils, Sable soils are poorly drained.

Typical pedon of Downs silt loam, 2 to 6 percent slopes, 1,980 feet south and 60 feet west of the northeast corner of sec. 23, T. 28 N., R. 10 E.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

B1—7 to 14 inches; brown (10YR 4/3), rubbed, light silty clay loam; weak fine subangular blocky structure parting to moderate very fine granular; friable; common fine roots; continuous thin very dark grayish brown (10YR 3/2) clay films on faces of peds; neutral; clear smooth boundary.

B21t—14 to 22 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak fine prismatic structure parting to moderate fine subangular blocky; friable; few fine roots; continuous thin dark brown (7.5YR 4/2) clay films and continuous moderately thick light gray (10YR 7/1, dry) uncoated silt and sand grains on faces of peds; neutral; gradual smooth boundary.

B22t—22 to 30 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few fine roots; discontinuous thin dark brown (7.5YR 4/2) clay films on faces of peds; medium acid; clear smooth boundary.

B3—30 to 49 inches; dark brown (10YR 4/3) silt loam; moderate medium prismatic structure; friable; few fine roots; continuous thin very dark grayish brown (10YR 3/2) clay films and continuous moderately thick light gray (10YR 7/2) uncoated silt and sand grains on vertical faces of peds; neutral; clear smooth boundary.

C—49 to 63 inches; yellowish brown (10YR 5/4) silt loam; few medium prominent light brownish gray (2.5Y 6/2) mottles; massive; friable; slight effervescence.

The solum is 40 to more than 60 inches thick. The A horizon is 6 to 10 inches thick. This soil is less than 10 percent sand.

The color of the Ap horizon has hue of 10YR, value of 2 and 3, and chroma of 1 or 2. If the A2 horizon is present, its color has hue of 10YR; value of 3, 4, or 5; and chroma of 2 or 3. The B horizon is silt loam or silty

clay loam. Its color has hue of 10YR, value of 4 through 6, and chroma of 3 through 5. The color of the C horizon has hue of 10YR, value of 4 or 5, and chroma of 3 through 6.

Drummer series

The Drummer series consists of deep, poorly drained, moderately permeable soils that formed in loess or silty sediment and the underlying stratified loamy or sandy outwash or glacial till. Drummer soils are in upland depressions and drainageways and on outwash plains and stream terraces. The slope is 0 to 2 percent.

Drummer soils are similar to Sable and Selma soils, and they are near Elburn, La Hogue, Andres, Elliott, Lisbon, and Odell soils. Sable soils formed entirely in silty material. Drummer soils have less sand in the solum than Selma soils. They are more poorly drained than Elburn, La Hogue, Andres, Elliott, Lisbon, and Odell soils.

Typical pedon of Drummer silty clay loam, 40 feet south and 90 feet west of the northeast corner of sec. 34, T. 43 N., R. 2 E.

Ap—0 to 12 inches; black (N 2/0) silty clay loam; moderate fine subangular blocky structure; friable; common fine roots; neutral; abrupt smooth boundary.

A12—12 to 19 inches; very dark gray (5Y 3/1) silty clay loam; moderate very fine subangular blocky structure; firm; common fine roots; neutral; abrupt smooth boundary.

B21g—19 to 27 inches; olive gray (5Y 5/2) silty clay loam; few fine distinct light yellowish brown (2.5Y 6/4) mottles; moderate very fine subangular blocky structure; firm; common fine roots; thin dark gray (5Y 4/1) and very dark gray (5Y 3/1) coatings on faces of peds; neutral; clear smooth boundary.

B22g—27 to 36 inches; olive gray (5Y 5/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; firm; neutral; clear smooth boundary.

B31g—36 to 43 inches; olive gray (5Y 5/2) silt loam; many medium prominent yellowish brown (10YR 5/6) mottles; moderate medium and coarse subangular blocky structure; friable; few fine angular pebbles; neutral; clear wavy boundary.

IIB32g—43 to 48 inches; olive gray (5Y 5/2) loam; many fine prominent yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; friable; many fine angular pebbles; neutral; clear wavy boundary.

IIC—48 to 60 inches; mixed olive gray (5Y 5/2) and yellowish brown (10YR 5/4) sandy loam; massive; friable; common fine angular pebbles and stones; neutral.

The solum is 44 to 60 inches thick. The loess or silty sediment is 40 to 60 inches thick.

The Ap and A12 horizons are silty clay loam or heavy silt loam. Their color has hue of 10YR to 5Y or neutral, value of 2 or 3, and chroma of 0 through 2. The B horizon is silty clay loam or silt loam. The IIB horizon ranges from silt loam to sandy loam. The color of the B and IIB horizons has hue of 10YR to 5Y, value of 4 or 5, and chroma of 1 or 2. The IIC horizon is stratified silt loam, clay loam, and sandy loam.

Dunbarton series

The Dunbarton series consists of shallow, well drained soils that formed in silty and loamy material and the underlying thin layers of clay loam and clay residuum of dolomitic bedrock. Dunbarton soils are on upland ridges and side slopes adjacent to drainageways. The slope ranges from 4 to 20 percent. Permeability is moderate in the upper part of the pedon and moderately slow in the lower part.

Dunbarton soils are similar to Sogn and Edmund soils, and they are near Whalan and NewGlarus soils. Sogn and Edmund soils have a darker colored A horizon than Dunbarton soils, and Sogn soils have more sand throughout. Dolomitic bedrock is at a greater depth in Whalan and NewGlarus soils than in Dunbarton soils.

Typical pedon of Dunbarton silt loam, 7 to 12 percent slopes, eroded, 420 feet north and 80 feet east of southwest corner of sec. 30, T. 29 N., R. 10 E.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) silt loam; moderate very fine subangular blocky structure; friable; many fine roots; neutral; abrupt smooth boundary.

B21t—5 to 10 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; firm; many roots; common brown (10YR 4/3) clay films on faces of peds; few fine pebbles; neutral; abrupt smooth boundary.

IIB22t—10 to 14 inches; brown (7.5YR 4/4) heavy clay loam; strong fine angular blocky structure; very firm; many roots; small stones and pebbles; small places of reddish brown (5YR 4/4) material; neutral; abrupt smooth boundary.

IIB23t—14 to 16 inches; dark reddish brown (5YR 3/4) clay; strong fine angular blocky structure; very firm; common roots; neutral; abrupt smooth boundary.

IIC—16 to 18 inches; brownish yellow (10YR 6/6) soft weathered fragments of dolomite; few roots; slight effervescence; mildly alkaline; abrupt smooth boundary.

IIR—18 inches; fractured dolomitic bedrock.

The thickness of the solum and the depth to bedrock are 12 to 20 inches. The loess is 0 to 13 inches thick.

The B horizon is as much as 15 percent, by volume, chert fragments.

The color of the Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. In uncultivated areas, the color of the A1 horizon has hue of 10YR, value of 2 or 3, and chroma of 2; and the color of the A2 horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. In the upper part, the B horizon is silt loam or silty clay loam. Its color has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. In the lower part, the B horizon ranges from silty clay loam to clay. Its color has hue of 10YR through 5YR, value of 4, and chroma of 3 through 6. On the average, the residuum in the lower part of the B horizon is between 40 and 60 percent clay. The underlying material is bedrock.

Edmund series

The Edmund series consists of shallow, well drained soils that formed in loess or loamy material and the underlying silty residuum of dolomitic limestone. Edmund soils are on upland ridges and side slopes. The slope ranges from 2 to 15 percent. Permeability is moderately slow.

Edmund soils are similar to Sogn and Dunbarton soils, and they are near Rockton and Dodgeville soils. Edmund soils have more clay than Sogn soils and have a higher organic matter content than Dunbarton soils. Rockton and Dodgeville soils are deeper to limestone than Edmund soils.

Typical pedon of Edmund silt loam, 5 to 9 percent slopes, 710 feet north and 210 feet east of the southwest corner of sec. 33, T. 27 N., R. 11 E.

Ap—0 to 7 inches; very dark gray (10YR 3/1) heavy silt loam; moderate very fine and fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

B1t—7 to 12 inches; very dark grayish brown (10YR 3/2) silty clay loam; moderate very fine subangular blocky structure; friable; many fine roots; neutral; abrupt smooth boundary.

IIB2t—12 to 15 inches; dark brown (7.5YR 3/3) heavy silty clay loam; moderate fine subangular blocky structure; firm; many fine roots; many small quartz and granite pebbles; thin discontinuous very dark grayish brown (10YR 3/2) clay films on faces of peds; slight effervescence; mildly alkaline; abrupt smooth boundary.

IIR—15 inches; pale yellow (2.5Y 7/4) and yellow (2.5Y 7/6) weathered dolomite bedrock.

The thickness of the solum and the depth to bedrock are 12 to 20 inches.

In most places, the Ap horizon is silt loam, but in some places it is loam. Its color has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The color of the B horizon has hue of 10YR, 7.5YR, or 5YR; value of 3 or 4; and chroma of 3 through 6. The B horizon ranges in texture from silty clay loam to clay.

Elburn series

The Elburn series consists of deep, somewhat poorly drained soils that formed in loess 40 to 60 inches thick and the underlying loamy or sandy waterlaid material. Elburn soils are on terraces and in low areas on uplands. The slope is 0 to 3 percent. Permeability is moderate in the solum and moderately rapid on the substratum.

Elburn soils are similar to Virgil soils, and they are near Drummer and Sable soils. Virgil soils have a thinner A horizon than Elburn soils. Drummer and Sable soils are more poorly drained than Elburn soils. In addition, Sable soils formed in loess that is more than 60 inches thick.

Typical pedon of Elburn silt loam, 140 feet south and 700 feet east of the center of sec. 30, T. 46 N., R. 2 E.

A11—0 to 11 inches; black (10YR 2/1) silt loam; moderate very fine and fine granular structure; friable; many fine roots; neutral; clear smooth boundary.

A12—11 to 15 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1), dry; moderate very fine subangular blocky structure; friable; many fine roots; neutral; clear smooth boundary.

A3—15 to 18 inches; very dark gray (10YR 3/1) heavy silt loam; moderate very fine angular blocky structure; firm; many fine roots; thin continuous black (10YR 2/1) coatings; neutral; clear smooth boundary.

B21t—18 to 26 inches; dark grayish brown (10YR 4/2) silty clay loam, few fine distinct dark brown (7.5YR 4/4) mottles; moderate fine subangular blocky structure; firm; common fine roots; thin continuous very dark grayish brown (10YR 3/2) clay films on faces of peds; few fine iron-manganese concretions; neutral; gradual smooth boundary.

B22t—26 to 35 inches; grayish brown (2.5Y 5/2) to light olive brown (2.5Y 5/3) silty clay loam; common medium prominent strong brown (7.5YR 5/8) mottles; moderate medium prismatic structure parting to angular blocky; firm; common fine roots; thin continuous very dark grayish brown (2.5Y 3/2) clay films and few moderately thick black (10YR 2/1) organic flows on vertical faces of peds; common fine iron-manganese concretions; neutral; clear smooth boundary.

B23t—35 to 42 inches; light olive brown (2.5Y 5/4) silty clay loam; many medium prominent strong brown (7.5YR 5/8) and common fine faint grayish brown (2.5Y 5/2) mottles; moderate medium prismatic structure; firm; few fine roots; continuous moderately thin very dark grayish brown (2.5Y 3/2) clay films on vertical faces of peds; common fine iron-manganese

concretions; few medium very dark grayish brown (10YR 3/2) fillings in worm channels; neutral; clear smooth boundary.

IIB3g—42 to 51 inches; grayish brown (2.5Y 5/2) silt loam that has noticeable sand grains; common medium prominent yellowish brown (10YR 5/6 to 5/8) and few medium prominent strong brown (7.5YR 5/8) mottles; weak coarse prismatic structure; friable; few fine roots; discontinuous thin dark grayish brown (10YR 4/2) clay films on vertical faces of peds; few fine iron-manganese concretions; few medium dark grayish brown (10YR 4/2) fillings in worm channels; neutral; abrupt wavy boundary.

IIC1—51 to 60 inches; brown (10YR 5/3) loamy sand; single grained; loose; neutral.

The solum is 45 to more than 60 inches thick.

The color of the A1 or Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The B horizon is heavy silt loam or silty clay loam. The IIB3 horizon ranges from silt loam to sandy clay loam. Its color has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 through 8. The IIC horizon is stratified calcareous outwash or calcareous sandy loam till.

Elco series

The Elco series consists of deep, moderately well drained soils that formed in loess and loamy material and a buried paleosol that formed in glacial till. Elco soils are on benches and on head slopes and side slopes along upland drainageways. The slope ranges from 2 to 6 percent. Permeability is moderate in the upper part of the pedon and moderately slow in the lower part.

Elco soils are similar to Assumption and St. Charles soils, and they are near Virgil and Kendall soils. Assumption soils have more organic matter in the surface horizon than Elco soils. St. Charles soils formed in deeper loess and do not have the gray paleosol in the lower part of the profile. Elco soils are better drained than Virgil and Kendall soils. They have a lower organic matter content than Virgil soils.

Typical pedon of Elco silt loam, 2 to 6 percent slopes, 900 feet south and 1,200 feet east of the northwest corner of sec. 33, T. 45 N., R. 3 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

A2—6 to 10 inches; yellowish brown (10YR 5/4) silt loam; weak thick platy structure parting to moderate medium granular; friable; few fine roots; few light gray (10YR 7/1, dry) uncoated silt and sand grains on faces of peds; dark grayish brown (10YR 4/2) fillings in worm holes; slightly acid; clear smooth boundary.

B21t—10 to 17 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine subangular blocky structure; friable; few fine roots; many thin dark yellowish brown (10YR 4/4) clay films; many light gray (10YR 7/1, dry) uncoated silt and sand grains on faces of peds; few black (10YR 2/1) iron and manganese concretions; medium acid; clear smooth boundary.

B22t—17 to 22 inches; yellowish brown (10YR 5/4) silty clay loam; few fine faint brown (10YR 5/3) and yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to strong fine and medium angular blocky; friable; few fine roots; thin continuous dark yellowish brown (10YR 4/4) clay films; many light gray (10YR 7/1, dry) uncoated silt and sand grains on faces of peds; few black (10YR 2/1) iron and manganese concretions; very dark brown (10YR 2/2) fillings in worm holes; slightly acid; clear smooth boundary.

B23t—22 to 28 inches; yellowish brown (10YR 5/4) silty clay loam; few medium distinct grayish brown (2.5Y 5/2) and strong brown (7.5YR 5/6) and common medium faint yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to strong medium angular blocky; friable; few fine roots; continuous thin dark yellowish brown (10YR 4/4) clay films and patchy light gray (10YR 7/1, dry) uncoated silt and sand grains on faces of peds; few black (10YR 2/1) iron and manganese concretions; very dark brown (10YR 2/2) fillings in worm holes; neutral; clear smooth boundary.

IIB3—28 to 32 inches; yellowish brown (10YR 5/6) light clay loam; common medium distinct brown (7.5YR 5/4) and grayish brown (10YR 5/2) mottles; weak medium prismatic structure parting to moderate medium angular blocky; friable; few fine roots; continuous thin dark grayish brown (10YR 4/2) clay films on faces of peds; few black (10YR 2/1) iron and manganese concretions; dark grayish brown (10YR 4/2) clay in worm holes; mildly alkaline; abrupt smooth boundary.

IIIB1b—32 to 42 inches; dark gray (10YR 4/1) silty clay loam; moderate medium prismatic structure; firm; few fine roots in upper part; few gray (10YR 6/1, dry) uncoated silt and sand grains on vertical faces of peds; brownish yellow (10YR 6/6) fillings in animal burrows; mildly alkaline; abrupt smooth boundary.

IIIB2tb—42 to 60 inches; gray (10YR 5/1) clay loam; common medium prominent olive brown (2.5Y 4/4) mottles; weak coarse prismatic structure; firm; many moderately thick dark gray (10YR 4/1) clay films on faces of peds; slight effervescence; mildly alkaline.

The solum is 48 to 60 inches thick. The silty material is 20 to 40 inches thick.

The A1 and A2 horizons typically are silt loam or loam. The color of the A1 or Ap horizon has hue of 10YR,

value of 3, and chroma of 1 or 2. The color of the A2 horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 4. The B horizon is silt loam, silty clay loam, or clay loam. Its color has hue of 10YR, value of 4 or 5, and chroma of 3 through 6. The lower part of the IIIB horizon, or the paleosol, has hue of 2.5Y, 5Y, or 10YR; value of 4 or 5; and chroma of 1 or 2. The lower part of the B horizon is more sandy and generally is more clayey than the upper part of the B horizon.

Elliott series

The Elliott series consists of deep, somewhat poorly drained soils that formed in loess and the underlying silty clay loam glacial till. Elliott soils are on low ridges and the upper part of side slopes on till plains of Wisconsin age. The slope is 0 to 3 percent. Permeability is moderately slow.

Elliott soils are similar to Andres and Lisbon soils, and they are near Varna and Drummer soils. Andres soils are deeper to the calcareous till than Elliott soils, and Lisbon soils have a higher content of sand in the underlying till. Elliott soils are not so well drained as Varna soils but are better drained than Drummer soils.

Typical pedon of Elliott silt loam, 513 feet north and 51 feet west of the southeast corner of sec. 23, T. 43 N., R. 2 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam; moderate fine granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

A12—8 to 12 inches; mixed very dark grayish brown (10YR 3/2) and dark brown (10YR 4/3) silty clay loam; moderate fine granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

B1—12 to 17 inches; very dark grayish brown (10YR 3/2) silty clay loam; many fine faint dark grayish brown (10YR 4/2) mottles and common fine prominent yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; few fine roots; few thin very dark gray (10YR 3/1) clay films on faces of peds; slightly acid; clear smooth boundary.

IIB2t—17 to 28 inches; grayish brown (10YR 5/2) silty clay loam; many fine prominent yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure parting to moderate medium angular blocky; friable; few fine roots; continuous thin black (N 2/0) clay films on vertical faces of peds; occasional pebbles, 2 to 4 mm in diameter; mildly alkaline; clear smooth boundary.

IIC1—28 to 50 inches; mixed light brownish gray (10YR 6/2) and dark yellowish brown (10YR 4/4) silty clay loam; few fine distinct yellowish brown (10YR 5/8) mottles; moderate coarse prismatic structure; firm; continuous thin very dark grayish brown (10YR 3/2) clay films on vertical faces of peds; common very dark grayish brown (10YR 3/2) fillings in root channels; several pebbles, 2 to 4 mm in diameter; slight effervescence; mildly alkaline; clear smooth boundary.

IIC2—50 to 60 inches; brown (10YR 5/3) clay loam; few fine distinct gray (10YR 5/1 and 6/1) and few fine prominent yellowish red (5YR 4/8) mottles; massive; firm; few fine roots; several very dark grayish brown (10YR 3/2) fillings in root channels; some pebbles, 2 to 4 mm in diameter; strong effervescence; moderately alkaline.

The solum is 20 to 45 inches thick.

The color of the Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The B horizon is silty clay loam or light silty clay. Its color has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 through 4. The color of the C horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 through 5.

Fayette series

The Fayette series consists of deep, well drained, moderately permeable soils that formed in loess or silty sediment. Fayette soils are on upland ridges, knolls, and foot slopes and on stream terraces. The slope ranges from 2 to 9 percent.

Fayette soils are similar to Rozetta, St. Charles, and Flagg soils, and they are near Stronghurst, Atterberry, and Palsgrove soils. Rozetta soils, like Fayette soils, formed in loess or silty sediment; unlike Fayette soils, Rozetta soils are moderately well drained. Unlike Fayette soils, St. Charles soils formed in loess or silty sediment and the underlying glacial outwash or glacial till, and Flagg soils formed in loess and the underlying glacial till. Stronghurst and Atterberry soils are somewhat poorly drained. Palsgrove soils have fractured dolomite bedrock within a depth of 60 inches.

Typical pedon of Fayette silt loam, 2 to 5 percent slopes, 145 feet north and 1,480 feet east of the southwestern corner of sec. 30, T. 28 N., R. 11 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; weak fine and medium granular structure; friable; slightly acid; abrupt smooth boundary.

A2—6 to 9 inches; mixed grayish brown (10YR 5/2) and yellowish brown (10YR 5/4) silt loam; few medium distinct yellowish brown (10YR 5/6) mottles; weak thick platy structure parting to weak medium granular; friable; medium acid; clear smooth boundary.

B1—9 to 12 inches; yellowish brown (10YR 5/4) light silty clay loam; weak fine and medium subangular blocky structure; few small iron and manganese concretions; medium acid; clear smooth boundary.

B21t—12 to 17 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; thin discontinuous brown (10YR 4/3) clay films and thin patchy light gray (10YR 7/1, dry) uncoated silt and sand grains on faces of peds; few small black (10YR 2/1) iron and manganese concretions; medium acid; clear smooth boundary.

B22t—17 to 22 inches; yellowish brown (10YR 5/4) silty clay loam; strong fine and medium subangular and angular blocky structure; firm; thin continuous brown (10YR 4/3) clay films and thin nearly continuous light gray (10YR 7/2) uncoated silt and sand grains on faces of peds; medium acid; clear smooth boundary.

B23t—22 to 31 inches; yellowish brown (10YR 5/4) silty clay loam; weak medium prismatic structure parting to strong medium angular blocky; firm; thin continuous brown (10YR 4/3) clay films and moderately thick light gray (10YR 7/1, dry) uncoated silt and sand grains on faces of peds; common fine black (10YR 2/1) iron and manganese concretions; strongly acid; clear smooth boundary.

B31t—31 to 43 inches; yellowish brown (10YR 5/4) light silty clay loam; few fine distinct light olive gray (5Y 6/2) mottles; weak coarse prismatic structure; friable; thin continuous brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

B32—43 to 57 inches; yellowish brown (10YR 5/4) silt loam; weak coarse prismatic structure; friable; thin discontinuous brown clay films on faces of peds; medium acid; clear smooth boundary.

C—57 to 60 inches; yellowish brown (10YR 5/4) silt loam; many medium prominent gray (5Y 6/1) mottles; massive; friable; streaks of yellowish brown (10YR 5/6 and 5/8); neutral.

The solum is 40 to more than 60 inches thick.

The color of the Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. The color of the A2 horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 4. The color of the B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4.

Flagg series

The Flagg series consists of deep, well drained, moderately permeable soils that formed in loess and the underlying glacial till. Flagg soils are on drainage divides, convex ridgetops, and side slopes on glaciated uplands. The slope ranges from 0 to 9 percent.

Flagg soils are similar to Fayette, Rozetta, St. Charles, and Pecatonica soils. They are near Kendall and Drummer soils. Unlike Flagg soils, Fayette soils formed entirely in loess, and Rozetta soils formed entirely in loess and are moderately well drained. St. Charles soils have more sand in the lower part of the solum than Flagg soils. Pecatonica soils have more sand in the upper part of the solum than Flagg soils. Flagg soils are better drained than Kendall soils, which formed in glacial outwash. They are better drained and do not have the dark colored A horizon of Drummer soils, which formed in glacial outwash.

Typical pedon of Flagg silt loam, 2 to 5 percent slopes, 1,010 feet south and 54 feet east of the northwest corner of sec 6, T. 45 N., R. 4 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; moderate medium granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

B1—7 to 10 inches; brown (10YR 5/3 and 4/3) heavy silt loam; moderate medium subangular blocky structure; friable; common fine roots; many light gray (10YR 7/1, dry) uncoated silt and sand grains on faces of peds; neutral; clear smooth boundary.

B21t—10 to 20 inches; yellowish brown (10YR 5/4) silty clay loam; strong fine and medium angular blocky and subangular blocky structure; friable; common fine roots; continuous thin brown (10YR 5/3) clay films on faces of peds; many light gray (10YR 7/2, dry) uncoated silt and sand grains; medium acid; clear smooth boundary.

B22t—20 to 28 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; friable; common fine roots; continuous thin brown (7.5YR 4/2) clay films and many light gray (10YR 7/1, dry) uncoated silt and sand grains on faces of peds; medium acid; clear smooth boundary.

B23t—28 to 37 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; common fine roots; many thin brown (7.5YR 4/4) clay films on faces of peds; medium acid; gradual smooth boundary.

IIB24t—37 to 64 inches; brown (7.5YR 4/4) clay loam; few medium faint brown (7.5YR 5/4) and few fine prominent yellowish brown (10YR 5/8) mottles; moderate coarse prismatic structure; friable; discontinuous thin dark reddish brown (5YR 3/4) clay films and continuous thick yellowish brown (10YR 5/4) uncoated silt and sand grains on faces of peds; medium acid.

The solum is more than 60 inches thick. The substratum is calcareous sandy loam. The loess is 25 to 50 inches thick.

The color of the Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The A2 horizon, if present, is silt loam. Its color has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The B horizon is silt loam or silty clay loam. Its color has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 through 5. The IIB horizon is silty clay loam, clay loam, loam, or sandy clay loam. Its

color has hue of 7.5YR or 5YR, value of 4 through 6, and chroma of 4 through 6.

Flagler series

The Flagler series consists of deep, somewhat excessively drained soils that formed in moderately coarse textured alluvial sediment and the underlying deposits of loamy sand or gravelly sand. Flagler soils are mainly on stream terraces. To a lesser extent, they are on low upland ridges and foot slopes. The slope ranges from 0 to 7 percent. Permeability is moderately rapid in the upper part of the pedon and very rapid in the lower part.

Flagler soils are similar to Billett soils, and they are near Hononegah, Warsaw, and Hoopeston soils. Billett soils have a thinner A horizon than Flagler soils. Warsaw and Hononegah soils have a thinner solum than Flagler soils and have calcareous sand and gravel within a depth of 40 inches. Flagler soils are better drained than Hoopeston soils.

Typical pedon of Flagler sandy loam, 0 to 3 percent slopes, 1,260 feet north and 2,520 feet west of the southeast corner of sec. 5, T. 45 N., R. 2 E.

Ap—0 to 8 inches; black (10YR 2/1) sandy loam; moderate fine and very fine granular structure; friable; many fine roots; neutral; clear smooth boundary.

A12—8 to 15 inches; black (10YR 2/1) sandy loam; moderate fine and very fine granular structure; friable; many fine roots; neutral; clear smooth boundary.

A13—15 to 23 inches; very dark brown (10YR 2/2) sandy loam; few fine faint dark yellowish brown (10YR 3/4) mottles; moderate fine subangular blocky structure; friable; many fine roots; neutral; gradual smooth boundary.

B1—23 to 29 inches; brown (10YR 4/3) sandy loam; moderate medium subangular blocky structure; friable; common fine roots; few thin very dark grayish brown (10YR 3/2) clay films on faces of peds; neutral; clear smooth boundary.

B2—29 to 33 inches; brown (10YR 4/3) sandy loam; moderate medium subangular blocky structure; very friable; few fine roots; few very dark brown (10YR 3/2) coatings; common pebbles, 1/2 inch in diameter; neutral; abrupt smooth boundary.

IIB31—33 to 36 inches; brown (7.5YR 4/4) very gravelly loamy sand; moderate medium subangular blocky structure; friable; few fine roots; neutral; abrupt smooth boundary.

IIB32—36 to 41 inches; strong brown (7.5YR 5/6) gravelly sand; weak fine subangular blocky structure; very friable; few fine roots; neutral; clear smooth boundary.

IIC—41 to 60 inches; yellowish brown (10YR 5/6) sand; single grained; loose; many fine pebbles; neutral.

The solum is 20 to 50 inches thick. The A horizon is 12 to 24 inches thick.

The color of the A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. The color of the B horizon has hue of 10YR or 7.5YR, value of 3 through 5, and chroma of 2 through 6. The IIB horizon ranges in texture from loamy sand to gravelly sand. The IIC horizon ranges in texture from loamy sand to gravelly sand. Its color has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 through 6.

Fox series

The Fox series consists of well drained soils that formed in loamy deposits and in the underlying sand and gravel. Fox soils are on stream terraces adjacent to stream channels and on side slopes of upland kames. Slopes range from 1 to 9 percent. Permeability is moderate in the solum and rapid in the substratum.

Fox soils are similar to Warsaw soils, and they are near Ockley and Martinsville soils. Warsaw soils have a darker colored surface layer than Fox soils. Unlike Fox soils, Ockley and Martinsville soils do not have contrasting textures above a depth of 40 inches. Ockley soils have gravel below a depth of 40 inches, and Martinsville soils are underlain by loamy glacial outwash.

Typical pedon of Fox loam, 5 to 9 percent slopes, eroded, 258 feet north and 111 feet east of the southwest corner of sec. 24, T. 46 N., R. 4 E.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) loam; moderate medium granular structure; friable; common moderately thick black (10YR 2/1) coatings on faces of peds; neutral; abrupt smooth boundary.

B21t—8 to 15 inches; dark yellowish brown (10YR 4/4) light clay loam; moderate fine subangular blocky structure; friable; neutral; clear smooth boundary.

B22t—15 to 18 inches; brown to dark brown (10YR 4/3) light clay loam; moderate fine and medium subangular blocky structure; friable; few thin dark grayish brown (10YR 4/2) clay films on faces of peds; neutral; clear smooth boundary.

IIB23t—18 to 24 inches; brown to dark brown (10YR 4/3) gravelly loam; moderate medium subangular blocky structure; friable; few thin brown (7.5YR 4/2) clay films on faces of peds; neutral; clear smooth boundary.

IIB3—24 to 28 inches; brown to dark brown (10YR 4/3) gravelly sandy loam; weak medium subangular blocky structure; friable; few thin brown to dark brown (7.5YR 4/2) clay films on faces of peds; neutral; abrupt smooth boundary.

IIC—28 to 60 inches; dark yellowish brown (10YR 4/4) sand and gravel; single grained; loose; strong effervescence; moderately alkaline.

The solum is 24 to 40 inches thick.

The A horizon typically is loam or silt loam. The color of the Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The B horizon typically is loam, clay loam, or silty clay loam. Its color has hue of 10YR, 7.5YR, or 5YR; value of 3 or 4; and chroma of 3 through 5.

Friesland series

The Friesland series consists of deep, well drained, moderately permeable soils that formed in loamy deposits and in underlying silty and loamy glacial till. Friesland soils are on upland ridgetops and the upper part of side slopes and on terraces. The landscape of Friesland soils consists of long, narrow, low ridges that extend east and west. The slope ranges from 0 to 6 percent but is dominantly 2 to 6 percent.

Friesland soils are similar to Grellton soils, and they are near Flagler and Billett soils. Unlike Friesland soils, Grellton soils have a light-colored A horizon, and Billett soils are sandy loam to a depth of 60 inches. Flagler soils have more sand and less clay in the B horizon than Friesland soils. Flagler and Billett soils are coarse loamy. Billett soils have a thinner A horizon than Friesland soils.

Typical pedon of Friesland sandy loam, 2 to 6 percent slopes, 66 feet north and 1,980 feet east of the center of sec. 13, T. 45 N., R. 2 E.

Ap—0 to 8 inches; black (10YR 2/1) sandy loam; weak coarse granular structure; very friable; common fine roots; neutral; abrupt smooth boundary.

A12—8 to 15 inches; very dark brown (10YR 2/2) sandy loam; weak medium and coarse granular structure; very friable; common fine roots; neutral; clear smooth boundary.

A3—15 to 20 inches; very dark grayish brown (10YR 3/2) sandy loam; weak medium subangular blocky structure; very friable; few fine roots; neutral; clear smooth boundary.

B21—20 to 30 inches; brown to dark brown (10YR 4/3) sandy loam; weak medium subangular blocky structure; very friable; few fine roots; neutral; clear smooth boundary.

B22t—30 to 39 inches; dark yellowish brown (10YR 4/4) light loam; moderate medium subangular blocky structure; very friable; few fine roots; common dark grayish brown (10YR 4/2) fillings in worm channels; neutral; abrupt smooth boundary.

IIB23t—39 to 50 inches; yellowish brown (10YR 5/4) silt loam; few medium distinct brown to dark brown (7.5YR 4/4) mottles; strong fine and medium angular blocky structure; friable; few fine roots; continuous thin brown (7.5YR 4/2) clay films on faces of peds; neutral; clear smooth boundary.

IIB24t—50 to 55 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct brown to dark brown (7.5YR 4/4) mottles; moderate medium subangular blocky structure; friable; few fine roots; common thin brown (7.5YR 4/2) clay films on faces of peds; slightly acid; clear smooth boundary.

IIIB25t—55 to 60 inches; mixed yellowish brown (10YR 5/4) and brown to dark brown (7.5YR 4/4) heavy loam; moderate medium subangular blocky structure; friable; common moderately thick brown (7.5YR 4/2) clay films on faces of peds; strongly acid.

The solum is 40 to 60 inches thick. The sandy loam material is 20 to 40 inches thick over the silt.

The color of the Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The B horizon ranges from loam to sandy clay loam. Its color has hue of 10YR or 7.5YR, value of 3 through 5, and chroma of 4 through 6. The IIB2 horizon is silt loam, heavy silt loam, or silty clay loam. Its color has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 through 6. The IIIB horizon, if present, is silt loam, loam, or sandy loam.

Grellton series

The Grellton series consists of deep, well drained, moderately permeable soils that formed in loamy sediment and the underlying silt. Grellton soils are on ridgetops and the upper part of side slopes on uplands and on stream terraces. The slope ranges from 1 to 9 percent.

Grellton soils are similar to Friesland soils, and they are near Billett and Fayette soils. Unlike Grellton soils, Friesland soils have a mollic epipedon, Billett soils are coarse-loamy and are not underlain by silt, and Fayette soils formed in deep loess.

Typical pedon of Grellton sandy loam, 1 to 5 percent slopes, 1,620 feet north and 760 feet east of the southwest corner of sec. 15, T. 46 N., R. 1 E.

Ap—0 to 7 inches; very dark brown (10YR 3/2) and light brownish gray (10YR 6/2, dry) sandy loam; common medium distinct brown to dark brown (10YR 4/3) mottles; weak fine angular blocky structure parting to weak moderate granular; very friable; many fine roots; few grayish brown (10YR 5/2) uncoated silt and sand grains on faces of peds; neutral; abrupt smooth boundary.

A2—7 to 11 inches; dark grayish brown (10YR 4/2) fine sandy loam; moderate medium platy structure; very friable; common fine roots; very dark gray (10YR 3/1) organic coatings; neutral; abrupt smooth boundary.

B1—11 to 16 inches; brown (10YR 4/3) very fine sandy loam; moderate medium subangular blocky structure; friable; common fine roots; few moderately thick dark grayish brown (10YR 4/2) clay films; neutral; clear smooth boundary.

B21t—16 to 22 inches; brown (10YR 4/3) sandy loam; moderate medium subangular blocky structure; friable; common fine roots; continuous thin dark grayish brown (10YR 4/2) clay films on faces of peds; neutral; clear smooth boundary.

IIB22t—22 to 29 inches; brown (10YR 4/3) silt loam; moderate fine columnar structure; friable; common fine roots; continuous thin dark grayish brown (10YR 4/2) clay films on faces of peds; neutral; clear smooth boundary.

IIB23t—29 to 36 inches; yellowish brown (10YR 5/4) silt loam; moderate medium columnar structure; moderate roots; many brown (10YR 4/3) clay films on faces of peds; many brown (10YR 3/4) iron concretions; mildly alkaline; clear smooth boundary.

IIC—36 to 60 inches; mixed yellowish brown (10YR 5/4) and dark grayish brown (10YR 4/2) silt loam; common fine distinct yellowish brown (10YR 5/6 to 5/8) mottles; massive; friable; few fine roots; mildly alkaline.

The solum is 36 to more than 60 inches thick. The fine sandy loam material is 20 to 40 inches thick over the silty material.

The A1 or Ap horizon is fine sandy loam or sandy loam. Its color has hue of 10YR, value of 2 through 4, and chroma of 2 or 3. The B horizon, above the silty material, is very fine sandy loam, sandy loam, or loam. Its color has hue of 10YR, value of 3 through 5, and chroma of 3 through 6. The IIB horizon is silt loam, heavy silt loam, or silty clay loam. Its color has hue of 10YR, value of 4 or 5, and chroma of 3 through 6. The IIC horizon is silt loam or loam.

Griswold series

The Griswold series consists of deep, well drained, moderately permeable soils that formed in calcareous sandy loam till. Griswold soils are on convex ridgetops and side slopes, mainly on glaciated uplands in Winnebago County. The slope ranges from 2 to 15 percent.

Griswold soils are similar to Jasper, Winnebago, and Ringwood soils. They are near Rockton, La Hogue, and Selma soils. Jasper soils have a thicker solum than Griswold soils, and they formed in glacial outwash. Unlike Griswold soils, Winnebago soils have a reddish-colored B horizon and formed in glacial drift; Ringwood soils formed in loess and sandy loam till; and the well drained Rockton soils, which are in positions on the landscape similar to those of Griswold soils, have dolomite at a depth between 20 and 40 inches. Griswold soils are better drained than La Hogue and Selma soils, which formed in glacial outwash.

Typical pedon of Griswold sandy loam, 2 to 5 percent slopes, 240 feet south and 90 feet east of the northwest corner of sec. 10, T. 45 N., R. 2 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) sandy loam; weak fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

A12—9 to 15 inches; dark brown (10YR 3/3) sandy loam; weak fine granular and very fine subangular blocky structure; friable; many fine roots; thin continuous very dark grayish brown (10YR 3/2) organic coatings; neutral; gradual smooth boundary.

B1—15 to 21 inches; brown (10YR 4/3) sandy loam; weak fine subangular blocky structure; friable; many fine roots; thin continuous very dark grayish brown (10YR 3/2) and dark brown (10YR 3/3) coatings and bridges; neutral; clear smooth boundary.

B21t—21 to 26 inches; brown (10YR 4/3) loam; weak fine subangular blocky structure; friable; many fine roots; continuous thin dark brown (10YR 3/3) clay films on faces of peds; slightly acid; abrupt smooth boundary.

IIB22t—26 to 36 inches; dark yellowish brown (10YR 4/4) gravelly sandy loam; moderate fine and medium subangular blocky structure; friable; common fine roots; common thin dark brown (10YR 3/3) clay films on faces of peds; many igneous pebbles; neutral; clear wavy boundary.

IIC—36 to 72 inches; light yellowish brown (10YR 6/4) sandy loam; massive; common strong brown (7.5YR 5/6) iron stains; many pebbles and rocks; violent effervescence; moderately alkaline.

The thickness of the solum and the depth to carbonates are 20 to 40 inches.

The A horizon is silt loam, loam, or sandy loam. Its color has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. The B horizon is sandy loam, loam, sandy clay loam, or clay loam. Its color has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 3 through 5. The color of the IIC horizon has hue of 10YR or 7.5YR, value of 5 through 7, and chroma of 4 through 6.

Hayfield series

The Hayfield series consists of somewhat poorly drained soils that formed in loamy sediment less than 40 inches thick over noncalcareous sand and gravel. Hayfield soils are on stream terraces. The slope is 0 to 3 percent. Permeability is moderate in the solum and rapid in the substratum.

Hayfield soils are similar to Beardstown soils, and they are near Marshan soils. Beardstown soils have a thicker solum than Hayfield soils. Marshan soils are more poorly drained than Hayfield soils.

Typical pedon of Hayfield loam, 141 feet south and 880 feet west of the center of sec. 1, T. 43 N., R. 4 E.

Ap—0 to 8 inches; black (10YR 2/1) loam; moderate medium granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

A2—8 to 14 inches; dark grayish brown (10YR 4/2) loam; common medium faint brown to dark brown (10YR 4/3) mottles; moderate medium platy structure; friable; few fine roots; very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

B2t—14 to 24 inches; brown (10YR 4/3) heavy loam; many medium faint dark grayish brown (10YR 4/2) and few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; neutral; abrupt smooth boundary.

IIC1—24 to 39 inches; mixed grayish brown (10YR 5/2), light brownish gray (10YR 6/2), and yellowish brown (10YR 5/6) sand; single grained; loose; neutral; abrupt smooth boundary.

IIC2—39 to 60 inches; mixed dark gray (10YR 4/1) and dark grayish brown (10YR 4/2) loamy sand; single grained; loose; neutral.

The solum is 20 to 40 inches thick.

The Ap and A2 horizons are loam or silt loam. The color of the Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The color of the A2 horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. The B horizon ranges in texture from clay loam to loamy sand. Its color has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 or 4. The IIC horizon ranges in texture from loamy sand to gravelly sand. Its color has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 1 through 6.

Herbert series

The Herbert series consists of deep, somewhat poorly drained, moderately permeable soils that formed in loess or silty material over calcareous loam glacial till. Herbert soils are on low rises and foot slopes on glaciated uplands in the eastern and southern parts of Boone County. The slope is 0 to 3 percent.

Herbert soils are similar to Virgil and Lisbon soils, and they are near Saybrook and Drummer soils. Unlike Herbert soils, Virgil soils formed in loess that is more than 40 inches thick over glacial outwash. Herbert soils have a thinner surface horizon than Lisbon and Saybrook soils. They are not so well drained as Saybrook soils but are better drained than Drummer soils. Drummer soils have a surface horizon that is darker colored than that of Herbert soils.

Typical pedon of Herbert silt loam, 1,320 feet north and 30 feet east of the southwest corner of sec. 25, T. 45 N., R. 4 E.

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) silt loam; moderate fine and very fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

A2—6 to 9 inches; brown (10YR 4/3) silt loam; moderate medium platy structure parting to fine subangular blocky; friable; common fine roots; common moderately thick pale brown (10YR 6/3) uncoated silt and sand grains on faces of peds; few very dark grayish brown (10YR 3/2) fillings in worm channels; neutral; abrupt smooth boundary.

B21t—9 to 18 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine prominent yellowish red (5YR 5/8) mottles; moderate fine subangular blocky structure; firm; common fine roots; continuous thin dark grayish brown (2.5Y 4/2) clay films and few moderately thick pale brown (10YR 6/3) uncoated silt and sand grains on faces of peds; strongly acid; clear smooth boundary.

B22t—18 to 28 inches; mixed grayish brown (2.5Y 5/2) and strong brown (7.5YR 5/8) silty clay loam; few fine prominent yellowish red (5YR 5/8) mottles; moderate fine and medium angular blocky structure; firm; common fine roots; thin continuous dark grayish brown (2.5Y 4/2) clay films on faces of peds; medium acid; clear smooth boundary.

B31t—28 to 40 inches; grayish brown (2.5Y 5/2) light silty clay loam; many fine prominent strong brown (7.5YR 5/8) and few fine prominent yellowish red (5YR 5/8) mottles; moderate coarse prismatic structure; friable; few fine roots; continuous thin dark grayish brown (2.5Y 4/2) clay films on vertical faces of peds; medium acid; clear smooth boundary.

IIC1—40 to 60 inches; grayish brown (2.5Y 5/2) loam; many medium prominent strong brown (7.5YR 5/8) and few fine prominent yellowish red (5YR 5/8) mottles; moderate coarse angular blocky structure; friable; many thin brown (10YR 4/3) coatings on vertical faces of peds; strong effervescence; moderately alkaline.

The solum is 22 to 40 inches thick. The loess is 20 to 40 inches thick. The substratum is 0 to 5 percent coarse fragments.

The color of the Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. The color of the A2 horizon has hue of 10YR or 2.5Y, value of 4 through 6; and chroma of 1 or 2. The color of the B horizon has hue of 2.5Y, 7.5YR, or 10YR; value of 4 through 6; and chroma of 2 through 8. The IIB horizon, if present, is loam or clay loam. Its color has hue of 2.5Y, 7.5YR, or 10YR; value of 4 or 5; and chroma of 2 through 8. The color of the IIC horizon has hue of 10YR, 7.5YR, or 2.5Y; value of 4 through 7; and chroma of 2 through 5.

Hitt series

The Hitt series consists of deep, well drained soils that formed in loess, glacial drift, and the underlying thin layers of clay residuum of dolomite. Hitt soils are on upland ridges mainly in the northwestern part of Winne-

bago County. The slope ranges from 0 to 9 percent. Permeability is moderate in the upper part of the pedon and slow in the lower part.

Hitt soils are similar to Ashdale soils, and they are near Ogle soils. Unlike Hitt soils, Ashdale soils are fine-silty and do not have glacial drift above the clay residuum, and Ogle soils do not have bedrock within a depth of 60 inches.

Typical pedon of Hitt silt loam, 2 to 5 percent slopes, 770 feet north and 800 feet west of the southeast corner of sec. 4, T. 44 N., R. 1 E.

Ap—0 to 9 inches; very dark gray (10YR 3/1) silt loam; weak fine subangular blocky structure; friable; many roots; slightly acid; abrupt smooth boundary.

A12—9 to 13 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine subangular blocky structure; friable; many roots; slightly acid; clear smooth boundary.

B21t—13 to 21 inches; dark brown (10YR 4/3) silty clay loam; moderate medium subangular blocky structure; friable; many roots; few coarse chert pebbles; medium acid; abrupt smooth boundary.

IIB22t—21 to 30 inches; brown (7.5YR 4/4) clay loam; weak medium subangular blocky structure; friable; few roots; common chert pebbles; medium acid; clear smooth boundary.

IIB23t—30 to 38 inches; brown (7.5YR 4/4) sandy clay loam; weak fine subangular blocky structure; friable; few roots; few chert pebbles; slightly acid; abrupt smooth boundary.

IIB24t—38 to 44 inches; dark reddish brown (5YR 3/4) heavy clay loam; weak fine subangular blocky structure; firm; few roots; slightly acid; abrupt smooth boundary.

IIIB25t—44 to 52 inches; dark reddish brown (5YR 3/4) clay; massive; neutral; abrupt smooth boundary.

IIIR—52 to 60 inches; fractured dolomite bedrock; loose dolomitic sand in the upper 3 inches.

The solum is 40 to 60 inches thick. The depth to fractured dolomite bedrock is 42 to 60 inches.

The color of the Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The color of the IIB horizon has hue of 2.5YR, 5YR, or 7.5YR; value of 3, 4, or 5; and chroma of 3, 4, or 5. The IIIB horizon is silty clay or clay residuum that has a variable content of chert.

Hononegah series

The Hononegah series consists of deep, excessively drained, very rapidly permeable soils that formed in sandy deposits and the underlying calcareous sand and gravel. Hononegah soils are on stream terraces mainly along the Rock and Kishwaukee Rivers. The slope ranges from 0 to 7 percent.

Hononegah soils are near Warsaw, Wea, and Flagler soils. Unlike Hononegah soils, Warsaw and Wea soils are loamy over the underlying gravel. Flagler soils have less sand in the solum than Hononegah soils.

Typical pedon of Hononegah loamy coarse sand, 0 to 3 percent slopes, 170 feet north and 2,060 feet east of the center of sec. 11, T. 46 N., R. 1 E.

Ap—0 to 8 inches; very dark brown (10YR 2/2) loamy coarse sand; weak fine subangular blocky structure parting to moderate medium granular; very friable; many fine roots; neutral; abrupt smooth boundary.

A12—8 to 15 inches; very dark brown (10YR 2/2) loamy coarse sand; few medium faint dark yellowish brown (10YR 3/4) mottles; moderate medium subangular blocky and angular blocky structure; very friable; common fine roots; neutral; clear smooth boundary.

A3—15 to 19 inches; dark brown (7.5YR 3/2) loamy coarse sand; weak medium and fine subangular blocky structure; very friable; few fine roots; neutral; clear smooth boundary.

B2—19 to 24 inches; dark yellowish brown (10YR 4/4) loamy coarse sand; weak fine subangular blocky structure; very friable; few fine roots; common small gravel; neutral; clear smooth boundary.

IIB3—24 to 31 inches; dark yellowish brown (10YR 4/4) very gravelly loamy coarse sand; single grained; loose; few fine roots; neutral; clear smooth boundary.

IIC—31 to 60 inches; yellowish brown (10YR 5/4) very gravelly loamy coarse sand; single grained; loose; strong effervescence; moderately alkaline.

The thickness of the solum and the depth to calcareous sand and gravel are 20 to 40 inches.

The color of the A horizon has hue of 10YR, value of 2 or 3, and chroma of 2 or 3. The B horizon ranges in texture from loamy coarse sand to very gravelly coarse sand. Its color has hue of 10YR, value of 4, and chroma of 3 or 4.

Hoopeston series

The Hoopeston series consists of deep, somewhat poorly drained soils that formed in loamy and sandy sediment. Hoopeston soils are in depressions and on low terraces along major streams. The slope is 0 to 3 percent. Permeability is moderately rapid in the solum and rapid in the substratum.

Hoopeston soils are similar to La Hogue and Kane soils, and they are near Flagler and Selma soils. Hoopeston soils have more sand than La Hogue and Kane soils. Kane soils have a higher content of gravel in the substratum than Hoopeston soils. Flagler soils are better drained than Hoopeston soils. Hoopeston soils are better drained than Selma soils.

Typical pedon of Hoopeston sandy loam, 2,560 feet north and 1,260 feet east of the southwest corner of sec. 24, T. 28 N., R. 11 E.

Ap—0 to 8 inches; very dark brown (10YR 2/2) sandy loam; moderate fine granular structure; friable; many fine roots; medium acid; clear smooth boundary.

A3—8 to 12 inches; very dark brown (10YR 2/2) sandy loam; moderate fine granular structure; friable; many fine roots; common grayish brown (2.5Y 5/2) flecks in root channels; medium acid; abrupt smooth boundary.

B2—12 to 22 inches; grayish brown (2.5Y 5/2) sandy loam; moderate medium subangular blocky structure; very friable; common fine roots; few thin dark gray (10YR 4/1) clay films on faces of peds; common very dark gray (10YR 2/2) fillings in worm channels; strongly acid; clear smooth boundary.

B3—22 to 28 inches; yellowish brown (10YR 5/4) light sandy loam; few fine distinct yellowish brown (10YR 5/8) mottles; weak fine subangular blocky structure; very friable; few fine roots; few thin dark gray (10YR 4/1) clay films on faces of peds; strongly acid; abrupt smooth boundary.

C1—28 to 38 inches; pale brown (10YR 6/3) light loamy sand; few fine distinct yellowish brown (10YR 5/8) mottles; single grained; loose; strongly acid; abrupt smooth boundary.

C2—38 to 60 inches; mixed light olive gray (5Y 6/2), dark grayish brown (10YR 4/2), yellowish brown (10YR 5/6), and pale brown (10YR 6/3) stratified fine sand, loamy sand, and sandy loam; loose to very friable; very strongly acid.

The solum is 20 to 44 inches thick.

The Ap horizon generally is sandy loam or fine sandy loam. Its color has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The B horizon typically is sandy loam, but in some pedons it is loam or sandy clay loam. The color of the B horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 through 4. The B horizon is mottled throughout. The C horizon is stratified sandy loam, loam, loamy sand, or sand. In some pedons, the C horizon has thin strata of gravel.

Houghton series

The Houghton series consists of deep, very poorly drained soils that formed in herbaceous organic deposits. Houghton soils are in low depressions on flood plains along rivers and small streams. The slope is 0 to 2 percent. Permeability is moderately rapid.

Houghton soils are similar to Adrian and Palms soils, and they are near Comfrey and Selma soils. Unlike Houghton soils, which formed entirely in organic deposits, Adrian soils have sand in the lower part of the profile, Palms soils have loam or silt in the lower part of the profile, and Comfrey and Selma soils formed in mineral deposits.

Typical pedon of Houghton muck, 1,890 feet north and 295 feet east of the southwest corner of sec. 10, T. 46 N., R. 4 E.

Oa1—0 to 9 inches; black (N 2/0), broken face and rubbed, sapric material; 95 percent fiber, 8 percent fiber rubbed; weak moderate subangular blocky structure parting to weak fine and very fine subangular blocky; strongly acid; clear smooth boundary.

Oa2—9 to 16 inches; black (N 2/0), broken face, and brown (7.5YR 4/4), open face and rubbed, sapric material; 95 percent fiber, 15 percent fiber rubbed; weak thick platy structure parting to weak medium granular; medium acid; clear smooth boundary.

Oa3—16 to 22 inches; black (N 2/0), broken face, brown (7.5YR 4/4), open face, and black (10YR 2/1), rubbed, sapric material; 95 percent fiber, 20 percent fiber rubbed; weak medium angular blocky structure; slightly acid; gradual smooth boundary.

Oa4—22 to 31 inches; black (N 2/0), broken face, brown (7.5YR 4/4), open face, and black (10YR 2/1), rubbed, sapric material; 95 percent fiber, 10 percent fiber rubbed; massive; neutral; gradual smooth boundary.

Oa5—31 to 53 inches; black (N 2/0), broken face, dark yellowish brown (10YR 4/4), open face, and black (N 2/0), rubbed, sapric material; 95 percent fiber, 5 percent fiber rubbed; massive; dark reddish brown (5YR 3/2) organic stains; neutral; abrupt wavy boundary.

IIC—53 to 60 inches; dark gray (10YR 4/1) loamy sand; massive; few fine roots; slightly acid.

The herbaceous organic material is more than 51 inches thick. In some pedons, there is fibric material throughout the profile.

The surface tier generally is sapric material, but in some pedons it is hemic material. The color of the surface tier has hue of 10YR, 7.5YR, 5YR, or neutral; value of 2 or 3; and chroma of 0 through 3. The subsurface tier also is sapric material, but can have as much as 10 inches of hemic material and as much as 5 inches of fibric material.

Jasper series

The Jasper series consists of deep, well drained, moderately permeable soils that formed in loess and in the underlying stratified loamy and sandy sediment. Jasper soils are on convex upland slopes and in slightly elevated areas on stream terraces and outwash plains. The slope ranges from 0 to 9 percent.

Jasper soils are similar to Plano soils, and they are near La Hogue soils. Plano soils have less sand in the

upper part of the B horizon than Jasper soils. La Hogue soils are somewhat poorly drained.

Typical pedon of Jasper silt loam, 2 to 5 percent slopes, 1,310 feet south and 390 feet west of the northeast corner of sec. 31, T. 43 N., R. 3 E.

Ap—0 to 9 inches; black (10YR 2/1) silt loam; moderate very fine and fine granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

A12—9 to 15 inches; very dark gray (10YR 3/1) silty clay loam; moderate very fine subangular blocky structure; friable; many fine roots; medium acid; clear smooth boundary.

B1—15 to 21 inches; dark brown (10YR 3/3) silty clay loam; weak and moderate fine subangular blocky structure; friable; common fine roots; thin discontinuous very dark grayish brown (10YR 3/2) clay films on faces of peds; medium acid; gradual smooth boundary.

B21t—21 to 28 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine subangular blocky structure; firm; few fine roots; thin discontinuous dark brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

IIB22t—28 to 34 inches; dark yellowish brown (10YR 4/4) loam; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; thin discontinuous dark brown (10YR 4/3) clay films on vertical faces of peds; medium acid; clear smooth boundary.

IIB31—34 to 39 inches; dark yellowish brown (10YR 4/4) sandy loam; weak coarse prismatic structure; friable; few dark brown (10YR 4/3) clay flows in worm channels; medium acid; abrupt smooth boundary.

IIB32—39 to 45 inches; dark yellowish brown (10YR 4/4) gravelly loamy sand; weak medium subangular blocky structure; friable; slightly acid; abrupt wavy boundary.

IIC1—45 to 55 inches; dark brown (7.5YR 4/4) fine sandy loam; massive; very friable; slightly acid; clear smooth boundary.

IIC2—55 to 60 inches; strong brown (7.5YR 5/6) loamy fine sand; single grained; loose; neutral.

The solum ranges from 30 to more than 60 inches in thickness.

The A horizon typically is silt loam or loam. Its color has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The B horizon ranges from silty clay loam to loam. Its color has hue of 10YR or 7.5YR, value of 3 through 5, and chroma of 3 through 8. The IIB horizon ranges from loam to loamy sand and has gravel in the lower part. The IIC horizon is stratified and ranges in texture from sand to silt.

Juneau series

The Juneau series consists of deep, moderately well drained, moderately permeable soils that formed in silty alluvium overlying an older buried soil. Juneau soils are on foot slopes and in narrow upland drainageways. The slope is 0 to 3 percent.

Juneau soils are similar to Troxel and Fayette soils, and they are near Orion soils. Troxel soils have a higher content of organic matter than Juneau soils. Juneau soils have a thicker A horizon than Fayette soils, which are not stratified. Juneau soils are better drained than Orion soils.

Typical pedon of Juneau silt loam, 700 feet north and 745 feet east of the center of sec. 21, T. 44 N., R. 3 E.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam; weak thin platy structure parting to moderate fine granular; friable; many fine roots; neutral; clear smooth boundary.

C1—9 to 14 inches; dark grayish brown (10YR 4/2) silt loam; weak thin platy structure; friable; many fine roots; few light gray (10YR 7/2) uncoated silt and sand grains on faces of peds; neutral; clear smooth boundary.

C2—14 to 26 inches; dark grayish brown (10YR 4/2) silt loam; few fine faint yellowish brown (10YR 5/4) mottles; moderate medium platy structure; friable; many fine roots; few light gray (10YR 7/2, dry) uncoated silt and sand grains on faces of peds; neutral; clear smooth boundary.

C3—26 to 33 inches; mixed dark grayish brown (10YR 4/2) and dark yellowish brown (10YR 4/4) silt loam; weak very thick platy structure; friable; common fine roots; many light gray (10YR 7/2) uncoated silt and sand grains on faces of peds; neutral; abrupt smooth boundary.

B21tb—33 to 40 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine prismatic structure parting to moderate fine angular blocky; friable; common fine roots; common thin dark grayish brown (10YR 4/2) clay films on faces of peds; few dark grayish brown (10YR 4/2) fillings in worm channels; medium acid; clear smooth boundary.

B22tb—40 to 51 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine prismatic structure parting to moderate medium angular blocky; friable; common fine roots; continuous thin dark brown (10YR 4/3) clay films and few very pale brown (10YR 7/3) uncoated silt and sand grains on faces of peds; few fine dark oxide concretions; medium acid; abrupt smooth boundary.

IIB3b—51 to 59 inches; dark brown (7.5YR 4/4) heavy loam; moderate coarse prismatic structure; friable; few fine roots; nearly continuous thin dark brown (7.5YR 4/2) clay films on faces of peds; few pebbles; slightly acid; abrupt smooth boundary.

IIC—59 to 69 inches; dark brown (7.5YR 4/4) clay loam; massive; few pebbles; slightly acid.

The thickness of the alluvium and the depth to the buried soil is 20 to 40 inches.

The color of the Ap and C horizons has hue of 10YR; value of 3, 4, or 5; and chroma of 2 or 3. The Bb horizon is silt loam, heavy silt loam, or silty clay loam. Its color has hue of 10YR or 7.5YR, value of 3 through 5, and chroma of 2 through 4. The IIBb horizon includes clay loam, silty clay loam, or loam. The IIC horizon, if present, has textures similar to those of the IIBb horizon.

Kane series

The Kane series consists of somewhat poorly drained soils that formed in silty and loamy sediment over calcareous sand and gravel. Kane soils are in depressions on low terraces and outwash plains. The slope is 0 to 3 percent. Permeability is moderate in the solum and rapid in the substratum.

Kane soils are similar to La Hogue and Hoopeston soils, and they are near Will and Warsaw soils. Kane soils have more gravel in the substratum than La Hogue and Hoopeston soils. They have less sand than Hoopeston soils. Warsaw soils are better drained than Kane soils. Kane soils are better drained than Will soils.

Typical pedon of Kane silt loam, 2,131 feet south and 117 feet east of the northwest corner of sec. 9, T. 43 N., R. 3 E.

Ap—0 to 9 inches; black (10YR 2/1) heavy silt loam; weak medium granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

A12—9 to 13 inches; very dark gray (10YR 3/1) heavy silt loam; moderate medium granular structure; friable; common fine roots; slightly acid; clear smooth boundary.

B21t—13 to 18 inches; dark grayish brown (10YR 4/2) silty clay loam; few fine faint yellowish brown (10YR 5/6) mottles; weak very fine subangular blocky structure; friable; few fine roots; thin discontinuous very dark gray (10YR 3/1) organic coatings on faces of peds; medium acid; clear smooth boundary.

IIB22t—18 to 22 inches; dark grayish brown (10YR 4/2) clay loam; few fine faint yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; few fine roots; thin discontinuous dark gray (10YR 4/1) clay films on faces of peds; common pebbles; 1 to 5 mm in diameter; medium acid; clear smooth boundary.

IIB23t—22 to 31 inches; grayish brown (2.5Y 5/2) clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; thin discontinuous dark grayish brown (10YR 4/2) clay films on vertical faces of peds; common pebbles, 5 to 10 mm in diameter; neutral; clear smooth boundary.

IIIC—31 to 60 inches; yellowish brown (10YR 5/4) sand and gravel; single grained; loose; strong effervescence; moderately alkaline.

The thickness of the solum and the depth to free carbonates and sand and gravel are 20 to 40 inches. In the upper part, the solum is less than 10 percent gravel.

The Ap horizon is silt loam, loam, or sandy loam. Its color has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The B horizon is silty clay loam, clay loam, or sandy clay loam. Its color has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 through 8. The C horizon is more than 35 percent coarse fragments. Its color has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3.

Kendall series

The Kendall series consists of deep, somewhat poorly drained, moderately permeable soils that formed in glacial outwash. Kendall soils are on the lower part of concave slopes and at the upper end of drainageways. They are on glaciated uplands and on stream terraces. The slope is 0 to 3 percent.

Kendall soils are similar to Virgil and Stronghurst soils, and they are near St. Charles and Drummer soils. Unlike Kendall soils, Virgil soils formed under a mixed prairie and timber vegetation, and Stronghurst soils formed entirely in loess. Kendall soils are not so well drained as St. Charles soils, and they are better drained than Drummer soils, which have a dark-colored surface horizon.

Typical pedon of Kendall silt loam, 1,800 feet south and 90 feet west of the northeast corner of sec. 30, T. 46 N., R. 3 E.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine granular structure; friable; many fine roots; many light gray (10YR 7/2) uncoated silt and sand grains on faces of peds; neutral; abrupt smooth boundary.

A2—9 to 12 inches; grayish brown (10YR 5/2) silt loam; few fine distinct dark yellowish brown (10YR 4/4) mottles; weak medium platy structure parting to moderate fine granular; friable; common fine roots; neutral; clear smooth boundary.

B21t—12 to 22 inches; grayish brown (10YR 5/2) silty clay loam; many medium distinct yellowish brown (10YR 5/4) mottles; moderate fine subangular blocky structure; friable; common fine roots; continuous thin dark gray (10YR 4/1) clay films on faces of peds; neutral; clear smooth boundary.

B22t—22 to 35 inches; yellowish brown (10YR 5/6 to 5/8) silty clay loam; many medium prominent gray (10YR 5/1) mottles; moderate medium prismatic structure parting to moderate medium subangular

blocky; firm; common fine roots; continuous thin dark gray (10YR 4/1) clay films on faces of peds; neutral; clear smooth boundary.

B31—35 to 45 inches; yellowish brown (10YR 5/6 and 5/8) and gray (10YR 5/1) silt loam; weak coarse prismatic structure; friable; few fine roots; many thin dark gray (10YR 4/1) clay films on faces of peds; neutral; clear smooth boundary.

IIB32—45 to 53 inches; yellowish brown (10YR 5/6) and gray to light gray (10YR 5/1 and 6/1) silt loam that has a noticeable amount of sand; friable; few fine roots; common black (10YR 2/1) iron-manganese accumulations; few thin dark gray (10YR 4/1) clay films; neutral; clear smooth boundary.

IIC—53 to 60 inches; yellowish brown (10YR 5/6) and grayish brown (10YR 5/2) heavy sandy loam; massive; friable; neutral.

The solum is 44 to 70 inches thick. The loess or silty material is 40 to 60 inches thick, and the depth to carbonates is 45 to 70 inches.

The color of the Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The color of the A2 horizon has hue of 10YR, value of 4 or 5, and chroma of 2. The color of the B horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 through 6. The IIB horizon is sandy clay loam, clay loam, loam, or sandy loam. Its color has hue of 7.5YR or 10YR, value of 4 through 8, and chroma of 4 through 8. The color of the IIC horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 2 through 6.

Kidder series

The Kidder series consists of deep, well drained soils that formed in loamy glacial till. Kidder soils are on shoulder slopes and side slopes on upland ridges. The slope ranges from 2 to 15 percent. Permeability is moderate in the upper part of the pedon and moderately rapid in the lower part.

Kidder soils are similar to McHenry soils, and they are near La Hogue and Westville soils. McHenry soils have a thicker loess mantle than Kidder soils, and Westville soils have a thicker solum. La Hogue soils, which formed in glacial outwash, are somewhat poorly drained.

Typical pedon of Kidder loam, 9 to 15 percent slopes, eroded, 2,580 feet north and 65 feet west of the southeast corner of sec. 24, T. 46 N., R. 2 E.

Ap—0 to 7 inches; dark brown (10YR 4/3) loam; moderate fine and medium granular structure; friable; many fine roots; occasional pebbles, 1 to 2 cm in diameter; neutral; abrupt smooth boundary.

B21t—7 to 18 inches; brown (7.5YR 5/4) clay loam; moderate medium subangular blocky and moderate fine angular blocky structure; firm; common fine roots; continuous thin dark brown (7.5YR 4/4 and 7.5YR 4/2) clay films on faces of peds; many rocks and pebbles; neutral; gradual smooth boundary.

B22t—18 to 23 inches; brown (7.5YR 4/4) light clay loam; few fine distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; friable; few fine roots; discontinuous thin dark brown (7.5YR 4/2) clay films on faces of peds; many rocks and pebbles; neutral; clear smooth boundary.

B3—23 to 27 inches; yellowish brown (10YR 5/4) sandy loam; weak medium subangular blocky structure; friable; few fine roots; few thin brown (7.5YR 4/2) clay films on faces of peds; many rocks and pebbles; slight effervescence; mildly alkaline; clear smooth boundary.

C—27 to 60 inches; light yellowish brown (10YR 6/4) sandy loam; massive; friable; many rocks and pebbles; violent effervescence; moderately alkaline.

The solum is 24 to 40 inches thick.

The Ap horizon typically is loam, but the range includes silt loam. Its color has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The B2t horizon ranges from loam to clay loam. Its color has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 3 or 4.

La Hogue series

The La Hogue series consists of deep, somewhat poorly drained soils that formed in thin loess and the underlying loamy and sandy outwash material. La Hogue soils are on stream terraces, on outwash plains, and in upland drainageways. The slope is 0 to 3 percent. Permeability is moderate in the upper part of the pedon and rapid in the lower part.

The La Hogue soils in this survey area have silt loam and silty clay loam to a depth of 22 inches and have a marginal argillic horizon; these characteristics are outside of the defined range for the series. However, these differences do not affect the use or behavior characteristics of these soils.

La Hogue soils are similar to Beardstown soils, and they are near Drummer and Selma soils. Beardstown soils have a thinner A horizon than La Hogue soils. La Hogue soils are not so poorly drained as Drummer and Selma soils.

Typical pedon of La Hogue silt loam, 145 feet north and 1,670 feet east of the southwest corner of sec. 4, T. 43 N., R. 3 E.

Ap—0 to 8 inches; black (10YR 2/1) silt loam; weak medium and coarse granular structure; friable; many fine roots; high content of fine sand; neutral; abrupt smooth boundary.

A12—8 to 15 inches; very dark grayish brown (10YR 3/2) silty clay loam; common fine faint brown (10YR 4/3) mottles; weak medium subangular blocky struc-

ture parting to moderate medium granular; friable; many fine roots; neutral; clear smooth boundary.

B21t—15 to 22 inches; dark grayish brown (10YR 4/2) silty clay loam; many fine prominent yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; many fine roots; thin continuous very dark gray (10YR 3/1) clay films on faces of peds; stones 1.5 to 3 cm in diameter at a depth of 17 inches; high content of fine sand; medium acid; gradual smooth boundary.

B22t—22 to 28 inches; dark grayish brown (2.5Y 4/2) clay loam; many medium prominent yellowish brown (10YR 5/6 to 5/8) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; many fine roots; thin discontinuous dark gray (10YR 4/1) clay films on horizontal faces of peds; thick black (10YR 2/1) coatings on vertical faces of peds; strongly acid; clear smooth boundary.

IIB23t—28 to 35 inches; mixed dark grayish brown (10YR 4/2) and yellowish brown (10YR 5/6) sandy clay loam; few fine prominent strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure; friable; few fine roots; thin discontinuous black (10YR 2/1) coatings on vertical faces of peds; high content of coarse sand; medium acid; clear smooth boundary.

IIB3—35 to 42 inches; mixed brown (10YR 4/3) and very dark grayish brown (10YR 3/2) loamy sand; weak coarse prismatic structure; very friable; patchy very dark brown (10YR 2/2) clay films on faces of peds; high content of coarse sand; neutral; abrupt smooth boundary.

IIC—42 to 54 inches; brown (10YR 5/3) coarse sand; single grained; loose; high content of coarse sand; slight effervescence; mildly alkaline.

The solum ranges from 40 to more than 60 inches in thickness. The A horizon is 10 to 24 inches thick.

The A horizon ranges from loam to silty clay loam. Its color has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. The B2 horizon ranges from sandy loam to silty clay loam. The B3 horizon ranges from loam to loamy sand. The C horizon ranges from coarse sand to loam and commonly is stratified. The color of the B and C horizons has hue that ranges from 7.5YR to 2.5Y, value of 4 through 6, and chroma of 2 through 6.

Lawson series

The Lawson series consists of deep, somewhat poorly drained, moderately permeable soils that formed in alluvium. Lawson soils are extensive on bottom lands along the Pecatonica River and along small streams and in drainageways throughout the survey area. The slope is 0 to 2 percent.

Lawson soils are similar to Orion soils. They are near Comfrey, Sawmill, and Troxel soils. Orion soils do not have a mollic epipedon. Lawson soils are better drained and have less sand in the solum than Comfrey soils. Sawmill soils are more poorly drained and have more clay than Lawson soils. Troxel soils are better drained and have more clay in the lower part of the solum than Lawson soils.

Typical pedon of Lawson silt loam, 820 feet east and 1,200 feet south of the center of sec. 1, T. 27 N., R. 10 E.

Ap—0 to 6 inches; black (10YR 2/1) silt loam; moderate fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

A12—6 to 12 inches; very dark grayish brown (10YR 3/2) silt loam; weak medium platy structure; friable; common fine roots; continuous dark grayish brown (10YR 4/2) coatings and few light gray (10YR 7/1) uncoated silt and sand grains on faces of peds; neutral; clear smooth boundary.

A13—12 to 27 inches; very dark grayish brown (10YR 3/2) silt loam; moderate fine angular and subangular blocky structure; friable; common fine roots; common dark grayish brown (10YR 4/2) coatings and few light gray (10YR 7/1) uncoated silt and sand grains on faces of peds; very dark gray (10YR 3/1) fillings in worm channels; mildly alkaline; gradual smooth boundary.

C1—27 to 40 inches; mixed very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2) heavy silt loam; moderate fine prismatic structure parting to moderate fine subangular blocky; friable; common fine roots; mildly alkaline; gradual smooth boundary.

C2—40 to 71 inches; very dark grayish brown (10YR 3/2) heavy silt loam; common coarse distinct grayish brown (10YR 5/2) and few medium faint brown (10YR 4/3) mottles; weak coarse prismatic structure; friable; few fine roots; very dark gray (10YR 3/1) fillings in root channels; neutral.

The mollic epipedon is 24 to 36 inches thick. The solum typically is silt loam or silty clay loam to a depth of 40 inches or more.

The color of the A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The C horizon typically is silt loam or silty clay loam; it commonly is stratified with loam or sandy loam. Its color has hue of 10YR or 2.5Y, value of 3 through 6, and chroma of 1 through 3.

Lisbon series

The Lisbon series consists of deep, somewhat poorly drained, moderately permeable soils that formed in silty sediment and the underlying calcareous loam glacial till. Lisbon soils are on slight convex rises and on concave

foot slopes, mainly on glaciated uplands in the eastern and southern parts of Boone County. The slope is 0 to 3 percent.

Lisbon soils are similar to Herbert and Elburn soils, and they are near Saybrook and Drummer soils. Herbert soils have a thinner surface horizon than Lisbon soils. Elburn soils have a thicker solum than Lisbon soils. Unlike Lisbon soils, Elburn and Drummer soils formed in glacial outwash. Lisbon soils are not so well drained as Saybrook soils, but they are better drained than Drummer soils.

Typical pedon of Lisbon silt loam, 1,190 feet north and 310 feet east of the southwest corner of sec. 36, T. 43 N., R. 4 E.

Ap—0 to 4 inches; very dark brown (10YR 2/2) silt loam; moderate fine granular structure; friable; slightly acid; abrupt smooth boundary.

A12—4 to 11 inches; very dark brown (10YR 2/2) silt loam; moderate medium granular structure; friable; neutral; clear smooth boundary.

B1—11 to 17 inches; brown (10YR 4/3) light silty clay loam; common fine faint dark grayish brown (10YR 4/2) and few fine faint grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; friable; medium acid; clear smooth boundary.

B21t—17 to 23 inches; yellowish brown (10YR 5/4) silty clay loam; few fine faint grayish brown (10YR 5/2) and few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure parting to strong fine subangular blocky; friable; continuous thin dark grayish brown (10YR 4/2) clay films on faces of peds; medium acid; clear smooth boundary.

B22t—23 to 28 inches; light olive brown (2.5Y 5/6) silty clay loam; common fine distinct yellowish brown (10YR 5/6) and few fine distinct grayish brown (2.5Y 5/2) mottles; strong fine angular blocky structure; firm; continuous thin grayish brown (10YR 5/2) clay films on faces of peds; neutral; clear smooth boundary.

B23t—28 to 36 inches; olive brown (2.5Y 4/4) light silty clay loam; many medium distinct grayish brown (10YR 5/2) mottles; weak medium prismatic structure parting to strong medium angular and subangular blocky; firm; continuous thin grayish brown (10YR 5/2) and few thin dark grayish brown (10YR 4/2) clay films on faces of peds; mildly alkaline; clear smooth boundary.

IIB3—36 to 39 inches; yellowish brown (10YR 5/6) clay loam; common medium distinct light brownish gray (10YR 6/2) and few medium faint light yellowish brown (10YR 6/4) mottles; weak coarse prismatic structure; firm; continuous thin dark grayish brown (10YR 4/2) clay films on vertical faces of peds; few fine black (10YR 2/1) iron-manganese accumulations; slight effervescence; mildly alkaline; clear smooth boundary. loam till; common fine distinct greenish gray (5GY 6/1) and few fine distinct yellowish brown (10YR 6/6) mottles; massive; firm; pale brown (10YR 6/3) coatings on vertical faces of joints; few fine black (10YR 2/1) iron-manganese accumulations; strong effervescence; moderately alkaline.

The thickness of the solum and the depth to free carbonates are 22 to 40 inches. The loess is 20 to 40 inches thick. The IIC horizon is 0 to 5 percent coarse fragments.

The color of the A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. The B horizon is silt loam or silty clay loam. Its color has hue of 2.5Y, 7.5YR, or 10YR; value of 4 through 6; and chroma of 2 through 6. The IIB horizon is clay loam or loam. Its color has hue of 2.5Y, 7.5YR, or 10YR; value of 4 through 6; and chroma of 2 through 6.

Marshan series

The Marshan series consists of poorly drained soils that formed in glacial outwash. Marshan soils are on low stream terraces and in old stream channels. The slope is 0 to 2 percent. Permeability is moderate in the solum and rapid in the substratum.

Marshan soils are similar to Selma soils. They are near Hayfield, La Hogue, and Jasper soils. Selma soils have a thicker solum than Marshan soils. Hayfield soils are somewhat poorly drained and have a thinner surface layer than Marshan soils. La Hogue soils are somewhat poorly drained and have a thicker solum than Marshan soils. Marshan soils are not so well drained as Jasper soils and have a thinner solum than those soils.

Typical pedon of Marshan loam, 1,500 feet north and 210 feet east of the southwest corner of sec. 1, T. 43 N., R. 4 E.

Ap—0 to 7 inches; black (10YR 2/1) loam; moderate medium granular structure; friable; many fine roots; neutral; clear smooth boundary.

A12—7 to 13 inches; very dark brown (10YR 2/2) loam; moderate fine granular structure; friable; common fine roots; neutral; clear smooth boundary.

A3—13 to 17 inches; very dark gray (10YR 3/1) and grayish brown (10YR 3/2) loam; moderate fine granular structure; friable; common fine roots; neutral; clear smooth boundary.

B2—17 to 20 inches; olive gray (5Y 5/2) and yellowish brown (10YR 5/4) loam; moderate medium subangular blocky structure; friable; few fine roots; few very dark gray (10YR 3/1) organic coatings; neutral; clear smooth boundary.

B3—20 to 24 inches; olive gray (5Y 5/2) light loam; few fine distinct dark gray (10YR 4/1) and olive (5Y 5/6) mottles; very friable; few fine roots; neutral; abrupt smooth boundary.

IIC—24 to 60 inches; pale olive (5Y 6/3) and brownish yellow (10YR 5/6) stratified coarse sand; single grained; loose; neutral.

The solum is 24 to 40 inches thick. The depth to carbonates is 50 to 75 inches.

The A horizon is loam, clay loam, or silty clay loam. Its color has hue of 10YR or 5Y, value of 2 or 3, and chroma of 1. The B horizon is loam, clay loam, or sandy loam. Its color has hue of 10YR, 5Y, or 2.5Y; value of 4 through 6; and chroma of 1 through 8.

Martinsville series

The Martinsville series consists of deep, well drained soils that formed in a thin mantle of loess and the underlying glacial outwash. Martinsville soils are on terrace breaks, convex upland ridges, and side slopes. The slope ranges from 0 to 9 percent. Permeability is moderate in the solum and moderately rapid in the substratum.

Martinsville soils are similar to Ockley and St. Charles soils. They are near Kendall and Beardstown soils. Unlike Martinsville soils, Ockley soils formed in calcareous sand and gravel. St. Charles soils have more silty material in the solum than Martinsville soils. Martinsville soils are better drained and have more sand in the solum than Kendall soils, which are somewhat poorly drained. Beardstown soils are more poorly drained and have a darker surface horizon than Martinsville soils.

Typical pedon of Martinsville silt loam, 0 to 2 percent slopes, 660 feet north and 910 feet west of the southeast corner of sec. 15, T. 28 N., R. 11 E.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam; moderate medium granular structure; friable; neutral; abrupt smooth boundary.

B1—9 to 12 inches; mixed brown (10YR 5/3) and dark brown (10YR 4/3) loam; moderate medium subangular blocky structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

IIB21—12 to 19 inches; dark yellowish brown (10YR 4/4) loam; weak and moderate medium subangular blocky structure; friable; many fine roots; few thin very dark grayish brown (10YR 3/2) clay films or linings; neutral; clear smooth boundary.

IIB22t—19 to 31 inches; dark yellowish brown (10YR 4/4) light clay loam; weak coarse prismatic structure parting to moderate medium subangular blocky; friable; common fine roots; few thin pale brown (10YR 6/3) uncoated silt and sand grains on faces of peds; neutral; clear smooth boundary.

IIB23t—31 to 37 inches; dark yellowish brown (10YR 4/4) heavy loam; moderate medium subangular blocky structure; friable; few fine roots; few thin dark brown (10YR 4/3) clay films on faces of peds; few soft black (10YR 2/1) iron-manganese accumulations; strongly acid; abrupt smooth boundary.

IIB31—37 to 49 inches; dark yellowish brown (10YR 4/4) sandy loam; weak medium subangular blocky structure; very friable; few fine roots; few thin dark brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

IIB32—49 to 58 inches; dark yellowish brown (10YR 4/4) sandy loam; weak coarse subangular blocky structure; very friable; few fine roots; few thin dark brown (10YR 4/3) clay films on faces of peds; medium acid; gradual smooth boundary.

IIC—58 to 64 inches; dark yellowish brown (10YR 4/4) loamy sand; single grained; loose; neutral.

The solum is 36 to 60 inches thick. Coarse fragments are scattered throughout the solum; the content of coarse fragments is 0 to 10 percent, by volume.

The Ap horizon is silt loam or loam. Its color has hue of 10YR, value of 4 or 5, and chroma of 2 through 4. The A2 horizon, if present, is silt loam or loam. Its color has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The B horizon is silty clay loam or loam. Its color has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 through 5. The IIB horizon is loam, clay loam, or sandy loam. Its color has hue of 10YR, 7.5YR, or 5YR; value of 4 through 6; and chroma of 3 through 6.

McHenry series

The McHenry series consists of deep, well drained soils that formed in loess and the underlying sandy loam glacial till. McHenry soils are on upland ridges and on side slopes along drainageways. The slope ranges from 2 to 9 percent. Permeability is moderate in the solum and moderately rapid in the substratum.

McHenry soils are similar to Westville and Kidder soils, and they are near Kendall soils. Westville soils have a redder B horizon than McHenry soils, and they are deeper to glacial till. Kidder soils have more sand throughout than McHenry soils. McHenry soils are better drained than Kendall soils.

Typical pedon in a cultivated area of McHenry silt loam, 5 to 9 percent slopes, eroded, 740 feet north and 280 feet west of the center of sec. 30, T. 44 N., R. 3 E.

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

B1—10 to 14 inches; dark yellowish brown (10YR 4/4) silt loam; light yellowish brown (10YR 6/4, dry); moderate very fine subangular blocky structure; friable; common fine roots; neutral; abrupt smooth boundary.

IIB21t—14 to 19 inches; dark brown (10YR 4/3) heavy loam; thin very pale brown (10YR 7/3) uncoated silt and sand grains on faces of peds; moderate medium subangular blocky structure; firm; common

fine roots; few stones, 1/2 inch to 1 1/2 inches in diameter; neutral; abrupt smooth boundary.

IIB22t—19 to 23 inches; dark brown (10YR 4/3) clay loam; thin very pale brown (10YR 7/3) uncoated silt and sand grains on faces of peds; moderate fine subangular blocky structure; firm; common roots; few small pebbles less than 1/2 inch in diameter; medium acid; clear smooth boundary.

IIB23t—23 to 30 inches; dark yellowish brown (10YR 4/4) heavy loam; weak medium prismatic structure parting to moderate coarse subangular blocky; firm; common roots; thin discontinuous very dark grayish brown (10YR 3/2) organic coatings; few fine pebbles; neutral; clear smooth boundary.

IIB3—30 to 36 inches; yellowish brown (10YR 5/4) loam; weak moderate subangular blocky structure; friable; very dark grayish brown (10YR 3/2) fillings in channels; few fine pebbles; mildly alkaline; clear smooth boundary.

IIC—36 to 60 inches; light yellowish brown (10YR 6/4) sandy loam; weak coarse subangular blocky structure; very friable; strong effervescence; moderately alkaline.

The solum is 30 to 40 inches thick.

The Ap horizon is silt loam, or it is silt loam that has a high content of sand. Its color has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The B horizon is silt loam, loam, silty clay loam, and clay loam in the upper part. It is loam to clay loam or sandy clay loam in the lower part.

Miami series

The Miami series consists of deep, well drained, moderately permeable soils that formed in a thin mantle of loess and the underlying calcareous loam glacial till. Miami soils are on convex ridgetops, knolls, and side slopes, mainly on glaciated uplands in the eastern and southern parts of Boone County. The slope ranges from 1 to 9 percent.

Miami soils are similar to Pecatonica and Martinsville soils. They are near Kendall, Odell, and Herbert soils. Pecatonica and Martinsville soils have a thicker solum than Miami soils. Unlike Miami soils, Pecatonica soils formed in reddish-colored glacial drift, and Martinsville soils formed in glacial outwash. Miami soils are better drained and have more sand in the solum than Kendall soils. They are better drained than the dark colored Odell soils, which formed in glacial till. Herbert soils, which are somewhat poorly drained, formed in glacial till and have more loess in their solum than Miami soils.

Typical pedon of Miami silt loam, 1 to 5 percent slopes, 1,395 feet north and 170 feet east of the southwest corner of sec. 36, T. 46 N., R. 4 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; moderate medium granular structure; friable; common fine roots; slightly acid; abrupt smooth boundary.

B21t—7 to 9 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; friable; common fine roots; neutral; abrupt smooth boundary.

IIB22t—9 to 12 inches; brown (10YR 4/3) clay loam; moderate fine angular and subangular blocky structure; friable; common fine roots; few medium black (10YR 2/1) iron-manganese concretions; neutral; clear smooth boundary.

IIB23t—12 to 19 inches; reddish brown (5YR 4/4) clay loam; weak medium prismatic structure parting to moderate fine and medium angular and subangular blocky; friable; few fine roots; many thin dark brown (7.5YR 4/2) clay films on faces of peds; slightly acid; clear smooth boundary.

IIB31—19 to 27 inches; mixed yellowish red (5YR 4/6) and yellowish brown (10YR 5/4) clay loam; weak medium and coarse prismatic structure parting to moderate medium angular blocky; firm; few fine roots; common moderately thick dark brown (7.5YR 4/2) clay films on faces of peds; neutral; clear smooth boundary.

IIB32—27 to 33 inches; mixed reddish brown (5YR 5/4) and brown (7.5YR 5/4) heavy clay loam; weak coarse prismatic structure or massive; firm; few fine roots; mildly alkaline; clear smooth boundary.

IIC—33 to 60 inches; brown (7.5YR 5/4) loam till; massive; dark brown (7.5YR 4/2) fillings in root channels; strong effervescence; moderately alkaline.

The thickness of the solum and the depth to carbonates are 24 to 42 inches. The content of coarse fragments in the solum is less than 10 percent, by volume.

The Ap horizon is silt loam, loam, or sandy loam. Its color has hue of 10YR, value of 3 through 5, and chroma of 2 or 3. The A2 horizon, if present, is silt loam, loam, or sandy loam. Its color has hue of 10YR, value of 4 through 6, and chroma of 2 through 4. The B horizon is silt loam, loam, sandy loam, clay loam, or silty clay loam. Its color has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 3 through 6. The IIB horizon is loam or clay loam. Its color has hue of 10YR, 7.5YR, or 5YR; value of 4 through 6; and chroma of 3 through 6.

Millington series

The Millington series consists of deep, poorly drained, moderately permeable soils that formed in stratified alluvium that derived from loess and calcareous glacial drift. Millington soils are in depressions and on flood plains along streams and rivers. The slope is 0 to 2 percent.

Millington soils are similar to Comfrey and Selma soils, and they are near Adrian and Houghton soils. Millington soils have a higher content of carbonates than Comfrey and Selma soils. They have a thicker A horizon and have

less sand than Selma soils. Unlike Millington soils, Adrian and Houghton soils formed in organic material. They have a lower content of carbonates than Millington soils.

Typical pedon of Millington silt loam in a cultivated field, 800 feet north and 2,500 feet west of the southwest corner of sec. 14, T. 46 N., R. 1 E.

Ap—0 to 8 inches; black (10YR 2/1) silt loam that is about 15 percent sand; few snail shells; moderate fine granular structure; friable; many fine roots; slight effervescence; mildly alkaline; abrupt smooth boundary.

A12—8 to 15 inches; black (10YR 2/1) silt loam that is about 20 percent sand; few snail shells; weak fine subangular blocky structure parting to moderate fine granular; friable; many fine roots; slight effervescence; mildly alkaline; clear smooth boundary.

A13—15 to 26 inches; black (10YR 2/1) silt loam that is about 20 percent sand; common snail shells; weak fine subangular blocky structure parting to moderate fine granular; friable; many fine roots; strong effervescence; moderately alkaline; clear smooth boundary.

B2—26 to 34 inches; mixed black (10YR 2/1) and dark grayish brown (10YR 4/2) heavy silt loam that is about 25 percent sand; many snail shells; moderate fine subangular blocky structure parting to moderate fine granular; friable; common fine roots; strong effervescence; moderately alkaline; clear smooth boundary.

B3—34 to 53 inches; dark grayish brown (2.5Y 4/2) loam; few fine distinct dark reddish brown (5YR 3/3) and many medium faint grayish brown (2.5Y 5/2) mottles; weak medium prismatic structure; friable; few fine roots; common pebbles, 0.5 to 1.5 cm in diameter; violent effervescence; strongly alkaline; clear smooth boundary.

C—53 to 60 inches; light grayish brown (2.5Y 6/2) loamy sand; single grained; loose; violent effervescence; strongly alkaline.

The solum is 24 to 40 inches thick. The profile is calcareous throughout. Snail shells are common in the upper part of the profile.

The Ap horizon commonly is silt loam, but the range includes loam, silty clay loam, sand, or clay loam. The color of the Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The B horizon generally is a part of the mollic epipedon and has the same color and texture as the A horizon. Any increase in clay content in the B horizon is due to stratification and not to translocation of clay from the upper horizons.

Muscatine series

The Muscatine series consists of deep, somewhat poorly drained, moderately permeable soils that formed in loess. Muscatine soils are on upland drainage divides and in depressions and drainageways. The slope is 0 to 3 percent.

Muscatine soils are similar to Atterberry, Elburn, and La Hogue soils. They are near Sable and Drummer soils. Muscatine soils have a thicker surface horizon than Atterberry soils. Unlike Muscatine soils, Elburn soils have outwash material in the lower part of the profile. La Hogue soils have more sand throughout than Muscatine soils. Muscatine soils are better drained and have less clay in the A horizon than Sable and Drummer soils.

Typical pedon of Muscatine silt loam in a cultivated field, 185 feet south and 860 feet west of the northeast corner of sec. 27, T. 26 N., R. 11 E.

Ap—0 to 11 inches; black (10YR 2/1) silt loam; moderate fine granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

A3—11 to 16 inches; very dark grayish brown (10YR 3/2) light silty clay loam; few fine distinct grayish brown (10YR 5/2) mottles; moderate medium granular structure; friable; few fine roots; common thin very dark gray (10YR 3/1) coatings on faces of peds; few yellowish red (5Y 4/6) iron concretions; neutral; clear smooth boundary.

B21—16 to 24 inches; brown (10YR 4/3) silty clay loam; many fine distinct grayish brown (10YR 5/2) mottles; moderate very fine subangular blocky structure; friable; few fine roots; common thin very dark grayish brown (10YR 3/2) clay and organic coatings on faces of peds; neutral; clear smooth boundary.

B22t—24 to 32 inches; yellowish brown (10YR 5/6) light silty clay loam; few fine prominent strong brown (7.5YR 5/6) mottles; friable; few fine roots; continuous thin dark grayish brown (10YR 4/2) clay films on faces of peds; many very dark grayish brown (10YR 3/2) fillings in root channels; neutral; clear smooth boundary.

B23t—32 to 41 inches; grayish brown (10YR 5/2) and yellowish brown (10YR 5/8) light silty clay loam; moderate medium prismatic structure; friable; few fine roots; continuous thin dark grayish brown (10YR 4/2) clay films on vertical faces of peds; many dark reddish brown (5YR 3/2) iron concretions; common black to very dark gray (10YR 2.5/1) fillings in root channels; neutral; clear smooth boundary.

C1—41 to 57 inches; brownish yellow (10YR 6/6) and gray to light gray (10YR 6/1) silt loam; few fine distinct strong brown (7.5YR 5/6) mottles; massive; friable; few fine roots; common very dark gray (10YR 3/1) fillings in root channels; neutral; clear smooth boundary.

C2—57 to 69 inches; yellowish brown (10YR 5/6), pale brown (10YR 6/3), and very pale brown (10YR 7/3) silt loam; massive; friable; common black to very dark gray (10YR 3/1) fillings in root channels; slight effervescence; mildly alkaline.

The solum is 40 to 60 inches thick. In places, carbonates are between depths of 48 and 72 inches.

The Ap horizon is silty clay loam or silt loam. Its color has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The B horizon is silty clay loam or silt loam. Its color has hue of 10YR to 2.5YR, value of 4 through 6, and chroma of 2 through 4. Mottles are throughout the lower part of the B horizon and the C horizon. Their color has hue of 10YR, 7.5YR, and 5YR; value and chroma are high.

NewGlarus series

The NewGlarus series consists of moderately deep, well drained soils that formed in loess and the underlying residuum of dolomite. NewGlarus soils are on convex ridges and side slopes. They are mapped only in an undifferentiated group with Whalan soils. The slope ranges from 2 to 15 percent. Permeability is moderate in the upper part of the pedon and moderately slow in the lower part.

NewGlarus soils are similar to Palsgrove, Whalan, and Dunbarton soils. They are near Pecatonica and Westville soils. Palsgrove soils have a thicker solum than NewGlarus soils. Whalan soils have more sand in their solum, and Dunbarton soils have less silt in their solum and are shallower to dolomite than NewGlarus soils. Unlike NewGlarus soils, Pecatonica soils are well drained and formed in glacial drift. Westville soils, which formed mainly in glacial drift, are in positions on the landscape similar to those of NewGlarus soils.

Typical pedon of NewGlarus silt loam in an area of Whalan and NewGlarus silt loams, 5 to 9 percent slopes, eroded, 1,150 feet north and 408 feet east of the center of sec. 34, T. 28 N., R. 10 E.

Ap—0 to 9 inches; brown (10YR 4/3) silt loam; cloddy structure parting to weak fine and medium granular; friable; common fine roots; neutral; abrupt smooth boundary.

B21t—9 to 13 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate very fine subangular blocky structure; friable; few fine roots; continuous thin brown (7.5YR 4/2) clay films on faces of peds; neutral; clear smooth boundary.

B22t—13 to 18 inches; brown (7.5YR 4/4) silty clay loam; strong fine angular blocky structure; friable; few fine roots; continuous thin brown (7.5YR 4/2) clay films on faces of peds; neutral; abrupt smooth boundary.

B23t—18 to 23 inches; reddish brown (5YR 4/4) silty clay loam; weak fine prismatic structure parting to moderate fine angular and subangular blocky; firm; few fine roots; continuous thin brown (7.5YR 4/2) clay films on faces of peds; medium acid; clear smooth boundary.

IIB24t—23 to 30 inches; reddish brown (5YR 4/4) clay; moderate medium prismatic structure parting to moderate medium angular and subangular blocky; firm; few fine roots; continuous thick reddish brown (5YR 4/3) clay films on faces of peds; common dark brown (7.5YR 3/2) iron accumulations; few chert pebbles; neutral; clear smooth boundary.

IIB25t—30 to 36 inches; strong brown (7.5YR 5/6) clay, few medium distinct brownish yellow (10YR 6/8) mottles; moderate coarse prismatic structure parting to moderate medium angular and subangular blocky; firm; few fine roots; continuous moderately thick brown (7.5YR 4/3) clay films on faces of peds; few dark brown (7.5YR 3/2) fillings in root channels; neutral; abrupt smooth boundary.

IIR—36 inches; fractured dolomite bedrock.

The solum is 20 to 40 inches thick. The loess is 15 to 30 inches thick, and the clayey residuum of dolomite is 10 to 20 inches thick. The dolomite bedrock commonly is fractured in the upper part and becomes more consolidated with depth.

The color of the Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. The B horizon is silt loam or silty clay loam. Its color has hue of 10YR or 7.5YR, value of 3 through 5, and chroma of 3 or 4. The IIB horizon is silty clay loam, silty clay, or clay. Its color has hue of 7.5YR or 5YR and value and chroma of 3 through 6.

Ockley series

The Ockley series consists of deep, well drained soils that formed in silty and loamy material over sand and gravel. Ockley soils are on broad terraces in major river valleys. The slope ranges from 0 to 5 percent. Permeability is moderate in the solum and very rapid in the substratum.

Ockley soils are similar to Martinsville soils, and they are near Fox and Warsaw soils. Unlike Ockley soils, Martinsville soils are underlain by sandy and loamy outwash material. Fox and Warsaw soils are shallower to gravel than Ockley soils, and Warsaw soils have a darker A horizon.

Typical pedon of Ockley silt loam, 0 to 2 percent slopes, 200 feet north and 200 feet west of the center of sec. 29, T. 44 N., R. 3 E.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

B1—9 to 13 inches; brown (10YR 4/3) heavy silt loam; weak very fine subangular blocky structure; friable; few fine roots; slightly acid; clear smooth boundary.

B21t—13 to 18 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; friable; few fine roots; many thin dark yellowish brown (10YR 4/4) clay films on faces of peds; few small pebbles 1 to 3 mm in diameter; slightly acid; clear smooth boundary.

IIB22t—18 to 26 inches; brown (10YR 4/3) clay loam; moderate medium subangular blocky structure; friable; few fine roots; thin continuous dark yellowish brown (10YR 4/4) clay films on faces of peds; 10 percent gravel, 1 to 10 mm in diameter; strongly acid; clear smooth boundary.

IIB23t—26 to 32 inches; yellowish brown (10YR 5/4) clay loam; few fine faint yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; many thin dark yellowish brown (10YR 4/4) clay films; 12 percent gravel, 1 to 15 mm in diameter; strongly acid; clear smooth boundary.

IIB24t—32 to 41 inches; brown (7.5YR 5/4) sandy clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; very friable; few fine roots; few thin dark brown (7.5YR 3/2) clay films on faces of peds; few pebbles, 1 to 5 mm in diameter; strongly acid; clear smooth boundary.

IIB31—41 to 47 inches; brown (7.5YR 5/4) and yellowish brown (10YR 5/6) sandy loam; weak medium subangular blocky structure; very friable; few fine roots; common thin brown (7.5YR 4/2) clay films on faces of peds; few black (10YR 2/1) iron-manganese concretions; strongly acid; clear smooth boundary.

IIB32—47 to 54 inches; brown (7.5YR 5/4) heavy sandy loam; weak medium subangular blocky structure; very friable; many thin dark brown (7.5YR 4/2) clay films on faces of peds; few black (10YR 2/1) iron-manganese concretions; many pebbles, 1 to 5 mm in diameter; medium acid; clear smooth boundary.

IIIC—54 to 60 inches; light yellowish brown (10YR 6/4) gravelly sand; single grained; loose; slight effervescence; mildly alkaline.

The thickness of the solum and the depth to calcareous sand and gravelly sand are 40 to 60 inches.

The color of the Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 3 through 6. The B horizon is silty clay loam or silt loam. The IIB horizon ranges from clay loam, gravelly clay loam, or gravelly sandy clay loam to sandy loam. Its color has hue of 10YR, 7.5YR, and 5YR; value of 4 or 5; and chroma of 3 through 6. The color of the lower part of the B2 horizon, near its contact with the C horizon, has value and chroma that range to 2 or 3.

Odell series

The Odell series consists of deep, somewhat poorly drained soils that formed in calcareous loam glacial till. Odell soils are on drainage divides and slight convex rises on till plains. The slope is 0 to 3 percent. Permeability is moderately slow.

Odell soils are similar to La Hogue and Lisbon soils, and they are near Parr and Selma soils. La Hogue soils have a thicker solum than Odell soils. Odell soils have more sand in their solum than Lisbon soils. They are not so well drained as Parr soils, and they are better drained than Selma soils. Unlike Odell soils, La Hogue and Selma soils formed in glacial outwash.

Typical pedon of Odell silt loam, 1,170 feet north and 138 feet west of the southeast corner of sec. 34, T. 44 N., R. 4 E.

Ap—0 to 7 inches; very dark gray (10YR 3/1) silt loam; moderate fine granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

A3—7 to 13 inches; very dark grayish brown (10YR 3/2) light clay loam; few fine faint dark grayish brown (10YR 4/2) mottles; weak fine subangular blocky structure parting to moderate fine granular; friable; few fine roots; common moderately thick very dark gray (10YR 3/1) clay films on faces of peds; neutral; clear smooth boundary.

B21t—13 to 21 inches; brown (10YR 4/3) clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; common thin very dark gray (10YR 3/1) clay films on faces of peds; several pebbles, 2 to 4 mm in diameter; neutral; clear smooth boundary.

B22t—21 to 29 inches; brown (10YR 5/3) clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; few fine roots; common moderately thick very dark grayish brown (10YR 3/2) clay films on faces of peds; some stones, 5 to 10 mm in diameter; neutral; clear smooth boundary.

B3—29 to 38 inches; brown (10YR 4/3) loam; few fine prominent yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; few fine roots; few moderately thick dark grayish brown (10YR 4/2) clay films on faces of peds; some pebbles, 2 to 4 mm in diameter; neutral; clear smooth boundary.

C1—38 to 55 inches; light yellowish brown (10YR 6/4) sandy loam; few fine prominent yellowish brown (10YR 5/8) and gray (10YR 6/1) mottles; massive; friable; many pebbles, 2 to 6 mm in diameter; slight effervescence; mildly alkaline; clear smooth boundary.

C2—55 to 60 inches; banded, pale brown (10YR 6/3) and brownish yellow (10YR 6/8) sandy loam; few

fine prominent yellow (10YR 7/6) mottles; massive; friable; many pebbles, 2 to 10 mm in diameter; strong effervescence; moderately alkaline.

The solum is 20 to 42 inches thick. The depth to carbonates is 20 to 40 inches. The glacial till is 0 to 3 percent coarse fragments.

The Ap horizon dominantly is silt loam, but it ranges in texture to include loam or silty clay loam. Its color has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The B horizon is silty clay loam, clay loam, or loam. Its color has hue of 10YR, 5Y, or 2.5Y; value of 4 through 6; and chroma of 3 or 4. The C horizon ranges from clay loam to sandy loam.

Ogle series

The Ogle series consists of deep, well drained, moderately permeable soils that formed in loess 30 to 50 inches thick and the underlying loamy glacial till. Ogle soils are on ridges and side slopes on glaciated uplands, mainly in Winnebago County. The slope ranges from 2 to 5 percent.

Ogle soils are similar to Tama, Downs, and Plano soils. They are near Muscatine and Comfrey soils. Downs soils have a thinner A horizon than Ogle soils. Unlike Ogle soils, Tama and Downs soils formed entirely in loess. In Plano soils, the lower part of the B horizon formed in glacial outwash. Ogle soils are better drained than Muscatine and Comfrey soils, which are in drainageways and on flood plains.

Typical pedon of Ogle silt loam, 2 to 5 percent slopes, 830 feet north and 635 feet west of the center of sec. 33, T. 44 N., R. 1 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam; moderate fine and medium granular structure; friable; many fine roots; neutral; clear smooth boundary.

A3—8 to 12 inches; very dark grayish brown (10YR 3/2) silt loam; many medium faint dark yellowish brown (10YR 3/4) mottles; weak fine subangular blocky structure parting to moderate fine and medium granular; friable; common fine roots; neutral; clear smooth boundary.

B21t—12 to 16 inches; dark yellowish brown (10YR 3/4) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; common very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

B22t—16 to 28 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few white (10YR 8/2, dry) uncoated silt and sand grains on faces of peds; continuous thin dark yellowish brown (10YR 3/4) clay films on faces of peds; slightly acid; clear smooth boundary.

B23t—28 to 34 inches; dark yellowish brown (10YR 4/4) light silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; one very dark gray (10YR 3/1) worm caste filling; slightly acid; clear smooth boundary.

B24t—34 to 41 inches; brown (7.5YR 4/4) loam; weak coarse prismatic structure or massive; friable; few fine roots; common very dark grayish brown (10YR 3/2) iron stains in pores; slightly acid; abrupt smooth boundary.

IIB25t—41 to 60 inches; reddish brown (5YR 4/4) and yellowish red (5YR 4/6) clay loam; common fine distinct (7.5YR 5/4) mottles; weak coarse prismatic structure; friable to firm; common thin reddish brown (5YR 4/4) clay films on faces of peds; slightly acid.

The solum commonly is more than 60 inches thick.

The color of the Ap, A12, or A3 horizon has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. The color of the B horizon has hue of 10YR or 7.5YR and value and chroma of 3 through 5. The IIB horizon commonly is clay loam or sandy clay loam, but it ranges in texture to include loam. Its color has hue of 7.5YR or 5YR and value and chroma of 4 through 6.

Orion series

The Orion series consists of deep, somewhat poorly drained, moderately permeable soils that formed in silty alluvium. Orion soils are along small streams and at the upper end of drainageways. The slope is 0 to 2 percent.

Orion soils are similar to Lawson soils, and they are near Juneau, Sawmill, and Comfrey soils. Unlike Orion soils, Lawson soils have a mollic epipedon. Orion soils are not so well drained as Juneau soils, and they are better drained than Sawmill soils, which formed in silty deposits and recent alluvium. They are better drained and have more silt in their solum than Comfrey soils.

Typical pedon of Orion silt loam, 80 feet north and 2,560 feet west of the center of sec. 32, T. 29 N., R. 10 E.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam; weak fine subangular blocky structure; friable; many roots; neutral; abrupt smooth boundary.

C1—9 to 21 inches; stratified dark grayish brown (10YR 4/2) and brown (10YR 5/3) silt loam; finely stratified structure parting to blocky fragments; friable; many fine roots; discontinuous thin red (2.5YR 4/6) coatings; neutral; abrupt smooth boundary.

A1b1—21 to 27 inches; very dark gray (10YR 3/1) silt loam; weak fine granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

C2—27 to 37 inches; stratified dark grayish brown (10YR 4/2) and brown (10YR 5/3) silt loam; weak medium platy structure; friable; few fine roots; many very

dark gray (10YR 3/1) coatings in worm channels; neutral; abrupt smooth boundary.

A1b2—37 to 60 inches; black (10YR 2/1) heavy silt loam; few fine faint dark brown (10YR 3/3) mottles; weak fine granular structure; friable; neutral.

The depth to a buried Ab horizon is 20 to 40 inches. The arrangement and thickness of the horizons are variable because of differences in the source of sediment and the method of deposition.

The Ap horizon is silt loam. Its color has hue of 10YR, value of 4, and chroma of 2. The color of the intervening C horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The Ab horizon or horizons are silt loam or silty clay loam. Their color has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2.

Palms series

The Palms series consists of deep, very poorly drained soils that formed in sapric organic material and loamy mineral substratum material. Palms soils are in low, swampy areas along small streams and in basins of former lakes and ponds. The slope is 0 to 2 percent. Permeability is moderately rapid in the upper part of the pedon and moderate in the lower part.

Palms soils are similar to Adrian and Houghton soils. They are near Sable, Drummer, Selma, and Comfrey soils. The substratum of Adrian soils has more sand than that of Palms soils. Unlike Palms soils, Houghton soils formed entirely in organic material; and Sable, Drummer, Selma, and Comfrey soils are mineral soils that formed in loess and loamy material.

Typical pedon of Palms muck, 115 feet south and 1,020 feet east of the northwest corner of sec. 15, T. 45 N., R. 4 E.

Oa1—0 to 6 inches; black (N 2/0 and 10YR 2/1), broken face, rubbed, and pressed sapric material; about 25 percent fiber, less than 5 percent fiber rubbed; fibers are herbaceous; moderate fine granular structure; friable; about 10 percent mineral material; neutral; clear smooth boundary.

Oa2—6 to 10 inches; black (N 2/0 and 10YR 2/1), broken face, rubbed, and pressed sapric material; about 7 percent fiber, less than 5 percent fiber rubbed fibers are herbaceous; moderate fine angular blocky structure; friable; about 15 percent mineral material; neutral; clear smooth boundary.

Oa3—10 to 32 inches; black (N 2/0 and 10YR 2/1), broken face, rubbed, and pressed sapric material; about 5 percent fiber, less than 5 percent fiber rubbed; fibers are herbaceous; massive; friable; about 10 percent mineral material; neutral; clear smooth boundary.

IICg—32 to 60 inches; greenish gray (5G 5/1) and gray (5Y 5/1) silty clay loam; massive; friable; mildly alkaline.

The solum is 16 to 50 inches thick. In some pedons, fragments of twigs and branches in the soil are as much as 1/2 inch in diameter.

The surface tier generally is sapric material, but in some pedons, it has some hemic material. The color of the surface tier has hue of 10YR, value of 2, and chroma of 1 or 2. The lower tiers are sapric material, although hemic material can total 10 inches in thickness. The color of the lower tiers has hue of 10YR, 7.5YR, 5YR, or neutral; value of 2 or 3; and chroma of 0 through 3. The C horizon ranges from fine sandy loam to silty clay loam. Its color has hue of 5G, 10YR, or 2.5Y; value of 4 through 6; and chroma of 1 or 2.

Palsgrove series

The Palsgrove series consists of deep, well drained soils that formed in loess and the underlying residuum of dolomite. Palsgrove soils are on crests and side slopes of upland ridges, mainly in the northwestern part of Winnebago County. The slope ranges from 2 to 9 percent. Permeability is moderate in the upper part of the pedon and very slow in the lower part.

Palsgrove soils are similar to NewGlarus soils, and they are near Fayette soils. NewGlarus soils formed in a thinner mantle of loess and are shallower to dolomite bedrock than Palsgrove soils. Unlike Palsgrove soils, Fayette soils formed entirely in loess or silty sediment.

Typical pedon of Palsgrove silt loam, 2 to 5 percent slopes, 1,260 feet north and 132 feet east of the center of sec. 34, T. 28 N., R. 10 E.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine granular structure; common fine roots; neutral; abrupt smooth boundary.

A2—8 to 12 inches; dark grayish brown (10YR 4/2) silt loam; moderate thick platy structure; friable; common fine roots; neutral; abrupt smooth boundary.

B21t—12 to 23 inches; brown (10YR 4/3) silty clay loam; strong fine subangular blocky structure; friable; common fine roots; few thin dark brown (10YR 3/3) clay films on faces of peds; medium acid; clear smooth boundary.

B22t—23 to 32 inches; brown (10YR 4/3) silty clay loam; moderate medium subangular blocky structure; friable; common fine roots; continuous thin dark brown (10YR 3/3) clay films and many thin light gray (10YR 7/2) uncoated silt and sand grains on faces of peds; strongly acid; clear smooth boundary.

B23t—32 to 50 inches; brown (10YR 4/3) silty clay loam; moderate medium prismatic structure; friable; few fine roots; continuous thin dark brown (10YR 3/3)

clay films and few thin light gray (10YR 7/2) uncoated silt and sand grains on faces of peds; medium acid; abrupt smooth boundary.

IIB3t—50 to 55 inches; dark reddish brown (5YR 3/4) silty clay; moderate medium prismatic structure; very firm; common moderately thick very dark gray (10YR 3/1) clay films on faces of peds; neutral; abrupt smooth boundary.

IIR—55 inches; fractured dolomitic bedrock.

The solum is 40 to 60 inches thick. The loess is 36 to 55 inches thick, and the residuum is 2 to 10 inches thick.

The color of the Ap or A1 horizon has hue of 10YR, value of 3 or 4, and chroma of 2 through 4. The color of the A2 horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The B horizon is silt loam or silty clay loam. Its color has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. The IIB horizon is silty clay or clay. Its color has hue of 7.5YR or 5YR and value and chroma of 3 through 5.

Parr series

The Parr series consists of deep, well drained, moderately permeable soils that formed in loess and the underlying calcareous loam glacial till. Parr soils are on low ridges and convex side slopes. The slope ranges from 2 to 9 percent.

Parr soils are similar to Jasper and Saybrook soils, and they are near Odell and Selma soils. Unlike Parr soils, Jasper soils formed in glacial outwash. Saybrook soils have more loess in their solum than Parr soils. Parr soils are better drained than Odell soils. They are also better drained than Selma soils, which formed in glacial outwash.

Typical pedon of Parr silt loam, 2 to 5 percent slopes, 195 feet north and 75 feet east of the southwest corner of sec. 12, T. 43 N., R. 3 E.

Ap—0 to 12 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine angular blocky structure parting to moderate medium granular; friable; common fine roots; neutral; abrupt smooth boundary.

A3—12 to 19 inches; mixed very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2) silt loam; moderate medium granular structure; friable; few fine roots; neutral; clear smooth boundary.

IIB2t—19 to 28 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine subangular blocky structure; friable; few fine roots; continuous thin dark brown (10YR 3/3) clay films on faces of peds; neutral; clear smooth boundary.

IIB3—28 to 36 inches; brown (7.5YR 5/4) clay loam; moderate medium angular blocky structure; friable; few fine roots; continuous thin very dark grayish brown (10YR 3/2) clay films on faces of peds; neutral; clear smooth boundary.

IIC—36 to 71 inches; light yellowish brown (10YR 6/4) loam; massive; friable; few fine roots; continuous thin brown (10YR 5/3) clay films on faces of peds; very dark grayish brown (10YR 3/2) coatings in root channels; strong effervescence; moderately alkaline.

The thickness of the solum and the depth to carbonates are 24 to 42 inches. The underlying material is less than 3 percent coarse fragments.

The Ap horizon is silt loam, loam, or fine sandy loam. Its color has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The IIB horizon is silty clay loam, clay loam, or loam. Its color has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4.

Pecatonica series

The Pecatonica series consists of deep, well drained, moderately permeable soils that formed in a thin mantle of loess and a paleosol that formed in sandy loam till. Pecatonica soils are on upland divides, ridgetops, and the upper part of side slopes. The slope ranges from 2 to 9 percent.

Pecatonica soils are similar to Westville, Flagg, Argyle, and McHenry soils, and they are near Palsgrove soils. Pecatonica soils have a lower organic matter content than Argyle soils. Westville soils have a thinner loess mantle and have more sand in the solum than Pecatonica soils. McHenry soils have a thinner solum, and Flagg soils have a thicker mantle of loess than Pecatonica soils. Unlike Pecatonica soils, Palsgrove soils are underlain by bedrock at a depth of 40 to 60 inches.

Typical pedon of Pecatonica silt loam, 2 to 5 percent slopes, 800 feet south and 50 feet east of the northwest corner of sec. 7, T. 43. N., R. 1 E.

A1—0 to 3 inches; very dark brown (10YR 2/2) silt loam; weak fine and medium granular structure; friable; slightly acid; abrupt smooth boundary.

A21—3 to 7 inches; grayish brown (10YR 5/2) silt loam; moderate thin platy structure; friable; very dark grayish brown (10YR 3/2) coatings in worm channels; medium acid; clear smooth boundary.

A22—7 to 12 inches; light yellowish brown (10YR 6/4) silt loam; weak thin platy structure; friable; light gray (10YR 7/1, dry) coatings; medium acid; clear smooth boundary.

B1—12 to 19 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine and medium subangular blocky structure; friable; light gray (10YR 7/1, dry) uncoated silt and sand grains on faces of peds; strongly acid; clear smooth boundary.

IIB21t—19 to 24 inches; dark brown (7.5YR 4/4) loam; moderate fine and medium subangular blocky structure; firm; thin continuous very dark gray (10YR 3/1) clay films and few light gray (10YR 7/1, dry) uncoat-

ed silt and sand grains on faces of peds; common pebbles; strongly acid; clear smooth boundary.

IIB22t—24 to 34 inches; red (2.5YR 4/6) and, in a few pockets, yellowish brown (10YR 5/4) sandy clay loam; moderate medium and coarse angular blocky structure; firm; thin continuous dark reddish brown (2.5YR 3/4) clay films on faces of peds; common pebbles; strongly acid; clear smooth boundary.

IIB23t—34 to 42 inches; mixed red (2.5YR 4/6), dark reddish brown (2.5YR 3/4), and, in a few pockets, yellowish brown (10YR 5/4) sandy clay loam; moderate medium and coarse angular blocky structure; firm; common pebbles; thin continuous dark reddish brown (2.5YR 3/4) clay films on faces of peds; medium acid; gradual smooth boundary.

IIB24t—42 to 58 inches; mixed red (2.5YR 4/6) dark reddish brown (2.5YR 3/4), and, in a few pockets, yellowish brown (10YR 5/4) sandy clay loam; weak coarse angular blocky structure; firm; common pebbles; thin continuous dark reddish brown (2.5YR 3/4) clay films on faces of peds; medium acid; clear smooth boundary.

IIB3—58 to 65 inches; dark brown (7.5YR 4/4) sandy loam; weak coarse angular blocky structure; firm; common pebbles; thin discontinuous dark brown (7.5YR 3/2) clay films on faces of peds; medium acid.

The solum is 45 to 90 inches thick. Loess is 15 to 25 inches thick over the paleosol.

The color of the A1 horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. In cultivated areas, the color of the Ap horizon has hue of 10YR, value of 4, and chroma 2 or 3. The color of the A2 horizon has hue of 10YR, value of 4 through 6, and chroma of 2 through 4. In the upper part, the B horizon ranges from silt loam to medium silty clay loam. Its color has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 through 6. In the lower part, the B horizon ranges from clay loam to sandy loam. Its color has hue of 5YR, 7.5YR, or 2.5YR; value of 3 through 5; and chroma of 4 through 6. The C horizon, if present, ranges from gravelly light sandy loam to sandy loam or loam.

Plano series

The Plano series consists of deep, well drained, moderately permeable soils that formed in loess and the underlying glacial outwash and till. Plano soils are on upland divides and on interfluves, side slopes, and terraces. The slope ranges from 0 to 9 percent.

Plano soils are similar to Tama, Ogle, and Jasper soils. They are near Elburn, Muscatine, Sable, and Drummer soils. Unlike Plano soils, Tama soils formed entirely in loess and are not underlain by coarser material, and Ogle soils formed in glacial drift. Jasper soils have more sand in the B horizon than Plano soils. Plano soils are better drained than Elburn and Muscatine soils. Unlike Plano soils, Sable and Drummer soils are poorly drained.

Typical pedon of Plano silt loam, 0 to 2 percent slopes, 540 feet north and 240 feet west of the southeast corner of sec. 34, T. 45 N., R. 1 E.

Ap—0 to 9 inches; very dark brown (10YR 2/2) silt loam; moderate fine and very fine granular structure; friable; many fine roots; neutral; clear smooth boundary.

A12—9 to 15 inches; very dark grayish brown (10YR 3/2) silt loam; moderate fine and medium subangular blocky structure; friable; many fine roots; many fine pores; common dark brown (10YR 3/3) fillings in root channels; mildly alkaline; abrupt smooth boundary.

A3—15 to 20 inches; dark brown (10YR 3/3) silt loam; common fine faint brown to dark brown (10YR 4/3) mottles; weak medium subangular blocky structure; friable; many fine roots; many fine pores; many black (10YR 2/1) fillings in worm channels; neutral; abrupt smooth boundary.

B21t—20 to 29 inches; dark brown (10YR 4/3) silty clay loam; moderate medium prismatic structure; friable; many fine roots; many fine pores; many thin dark brown (10YR 3/3) clay films on faces of peds; many black (10YR 2/1) fillings in worm channels; neutral; clear smooth boundary.

B22t—29 to 42 inches; dark brown (10YR 4/3) silty clay loam; few fine distinct yellowish brown (10YR 5/4 to 5/6) mottles; moderate medium prismatic structure; friable; common fine roots; many fine pores; continuous thin dark yellowish brown (10YR 3/4) clay films on faces of peds; many black (10YR 2/1) fillings in worm channels; neutral; abrupt smooth boundary.

IIB3—42 to 61 inches; dark yellowish brown (10YR 4/4) sandy loam; common medium faint yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; very friable; few fine roots; neutral; abrupt smooth boundary.

IIC2—61 to 67 inches; brown (10YR 5/3) light sandy loam; common medium faint yellowish brown (10YR 5/6) mottles; massive; very friable; neutral.

The solum is 44 to 70 inches thick, and the A horizon is 10 to 20 inches thick. In the upper part, the solum is less than 10 percent sand; in the lower part, it is more sandy and is as much as 10 percent gravel.

The color of the Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1, 2, or 3. The B horizon is silty clay loam in the upper part and silt loam to sandy loam or sandy clay loam in the lower part. Its color has hue of 7.5YR or 10YR, value of 3 through 5, and chroma of 3 or 4. The C horizon is stratified outwash material, or sandy loam till, or both.

Ringwood series

The Ringwood series consists of deep, well drained soils that formed in loess and the underlying calcareous sandy loam glacial drift. Ringwood soils are on upland ridgetops, side slopes, and shoulder slopes. The slope ranges from 2 to 9 percent. Permeability is moderate in the solum and moderately rapid in the substratum.

Ringwood soils are similar to Plano, Griswold, and Winnebago soils, and they are near Elburn and Hitt soils. Plano soils have a thicker solum, Griswold soils have more sand throughout, and Winnebago soils have a redder B horizon than Ringwood soils. Ringwood soils have a thinner solum and are better drained than Elburn soils. Hitt soils have more clay in the lower part of the B horizon than Ringwood soils and have bedrock within a depth of 60 inches.

Typical pedon of Ringwood silt loam, 5 to 9 percent slopes, eroded, 1,100 feet east and 1,740 feet north of the center of sec. 7, T. 45 N., R. 3 E.

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) silt loam; moderate fine granular structure; friable; common fine roots; slightly acid; clear smooth boundary.

A3—6 to 11 inches; dark brown (10YR 3/3) silt loam; moderate fine granular structure; friable; common fine roots; medium acid; clear smooth boundary.

B21t—11 to 16 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; friable; few fine roots; common thin very dark grayish brown (10YR 3/2) clay films on faces of peds; medium acid; clear smooth boundary.

IIB22t—16 to 21 inches; brown (10YR 4/3) clay loam, moderate fine subangular blocky structure; friable; few fine roots; common thin very dark grayish brown (10YR 3/2) clay films on faces of peds; few pebbles, 1 to 5 mm in diameter; slightly acid; clear smooth boundary.

IIB23t—21 to 28 inches; brown (7.5YR 4/4) clay loam; moderate fine subangular blocky structure; friable; few fine roots; few thin dark brown (7.5YR 4/2) clay films on faces of peds; some pebbles, 1 to 10 mm in diameter; slightly acid; clear smooth boundary.

IIB3—28 to 32 inches; mixed brown (7.5YR 4/4) and dark yellowish brown (10YR 4/4) sandy clay loam; moderate fine subangular blocky structure; friable; few fine roots; some glacial pebbles, 1 to 10 mm in diameter; neutral; clear smooth boundary.

IIC—32 to 60 inches; light yellowish brown (10YR 6/4) sandy loam; massive; friable; some pebbles 1 to 10 mm in diameter and 1 pebble 30 mm in diameter; violent effervescence; strongly alkaline.

The solum is 30 to 50 inches thick. In the upper part, the solum is as much as 35 percent sand. In places, free carbonates are in the lower part of the solum.

The color of the Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The B horizon is silt loam, loam, clay loam, or silty clay loam. Its color has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 through 8. The IIB horizon is loam, clay loam, or sandy clay loam.

Rockton series

The Rockton series consists of moderately deep, well drained, moderately permeable soils that formed in glacial drift and the underlying clayey residuum of dolomite. Rockton soils are on upland crests and side slopes, mainly in Winnebago County. They are mapped only in an undifferentiated group with Dodgeville soils. The slope ranges from 1 to 15 percent.

Rockton soils are similar to Dodgeville and Hitt soils, and they are near Winnebago and Argyle soils. Dodgeville soils have less sand in the solum than Rockton soils. Hitt soils have a thicker solum than Rockton soils and are deeper to dolomite bedrock. Unlike Rockton soils, Winnebago and Argyle soils formed in glacial drift and do not have dolomite bedrock within a depth of 60 inches.

Typical pedon of Rockton loam in an area of Rockton and Dodgeville soils, 1 to 5 percent slopes, 2,020 feet north and 700 feet west of the southeast corner of sec. 30, T. 27 N., R. 11 E.

Ap—0 to 10 inches; very dark gray (10YR 3/1) loam; moderate fine granular structure; friable; many fine roots; neutral; clear smooth boundary.

B1t—10 to 14 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine subangular blocky structure; friable; common fine roots; many thin very dark grayish brown (10YR 3/2) clay films and organic coatings on faces of peds; mildly alkaline; clear smooth boundary.

B21t—14 to 21 inches; dark brown (7.5YR 4/4) clay loam; moderate medium subangular blocky structure; firm; common fine roots; many thin dark brown (7.5YR 4/2) clay films on faces of peds; few very dark grayish brown (10YR 3/2) fillings in root channels; slightly acid; clear smooth boundary.

IIB22t—21 to 25 inches; dark brown (7.5YR 4/4) clay; moderate medium subangular blocky structure; firm; common fine roots; slightly acid; clear smooth boundary.

IIR—25 inches; fractured dolomite bedrock.

The thickness of the solum and the depth to bedrock are 20 to 40 inches. The A horizon is 10 to 18 inches thick.

The A horizon typically is loam, but it ranges in texture from silt loam to sandy loam. Its color has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. The B horizon typically is loam or clay loam, but it ranges in the

upper part to include silt loam or silty clay loam. The color of the part of the B horizon that formed in glacial drift has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. The IIB horizon, which formed in residuum, is silty clay or clay. Its color has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 3 or 4.

Rodman series

The Rodman series consists of excessively drained soils that are shallow to calcareous sand and gravel. Permeability is very rapid. Rodman soils are on kames, eskers, and terrace breaks. The slope ranges from 4 to 30 percent. In most areas, Rodman soils are mapped in a complex with Warsaw soils.

Rodman soils are similar to Warsaw soils, and they are near Hononegah, Jasper, Warsaw, and Wea soils. Rodman soils have a thinner solum than Warsaw soils. They also have a thinner solum than Hononegah, Jasper, and Wea soils.

Typical pedon of Rodman gravelly loam in an area of Rodman-Warsaw complex, 7 to 12 percent slopes, eroded, 1,420 feet north and 840 feet west of the center of sec. 32, T. 43 N., R. 3 E.

A1—0 to 7 inches; very dark brown (10YR 2/2) gravelly loam; moderate medium granular structure; friable; many fine roots; neutral; clear wavy boundary.

B2—7 to 13 inches; dark brown (10YR 4/3) gravelly loam; moderate very fine subangular blocky structure parting to moderate very fine granular; friable; many fine roots; neutral; clear wavy boundary.

C—13 to 60 inches; dark yellowish brown (10YR 4/4) gravel and sand; single grained; loose; slight effervescence; mildly alkaline.

The solum is 8 to 15 inches thick. It typically is gravelly loam or gravelly sandy loam.

The color of the A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The color of the B horizon has hue of 10YR or 7.5YR, value of 3 through 5, and chroma of 3 or 4.

Rozetta series

The Rozetta series consists of deep, moderately well drained, moderately permeable soils that formed in loess or silty sediment. Rozetta soils are on broad upland drainage divides, foot slopes, and stream terraces. The slope is 0 to 3 percent.

Rozetta soils are similar to Fayette, St. Charles, and Flagg soils, and they are near Stronghurst and Atterberry soils. Unlike Rozetta soils, Fayette, St. Charles, and Flagg soils are well drained; St. Charles soils formed in loess or silty sediment and the underlying glacial outwash or till; and Flagg soils formed in loess and the underlying glacial till. Rozetta soils are better drained than Stronghurst and Atterberry soils.

Typical pedon of Rozetta silt loam, 0 to 3 percent slopes, 2,160 feet north and 2,580 feet east of the southwest corner of sec. 36, T. 26 N., R. 11 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine granular structure; friable; many fine roots; few very pale brown (10YR 7/3) silt coatings; neutral; abrupt smooth boundary.

A2—7 to 10 inches; brown (10YR 5/3) silt loam; moderate medium platy structure; friable; common fine roots; common dark grayish brown (10YR 4/2) fillings in worm channels; neutral; clear smooth boundary.

B1—10 to 14 inches; yellowish brown (10YR 5/4) heavy silt loam; moderate fine subangular blocky structure; friable; common fine roots; continuous thin dark yellowish brown (10YR 4/4) clay films and common very pale brown (10YR 7/3) uncoated silt and sand grains on faces of peds; common fine black (10YR 2/1) iron and manganese accumulations; neutral; clear smooth boundary.

B21t—14 to 21 inches; yellowish brown (10YR 5/4) silty clay loam; strong fine angular blocky structure; friable; common fine roots; continuous thin dark yellowish brown (10YR 4/4) clay films and continuous pale brown (10YR 6/3) uncoated silt and sand grains on faces of peds; common fine black (10YR 2/1) iron and manganese accumulations; medium acid; clear smooth boundary.

B22t—21 to 28 inches; yellowish brown (10YR 5/4) silty clay loam; common medium faint pale brown (10YR 6/3) and few medium distinct strong brown (7.5YR 5/6) mottles; strong moderate subangular blocky structure; friable; common fine roots; continuous thin brown (10YR 4/3) clay films and continuous pale brown (10YR 6/3) uncoated silt and sand grains on faces of peds; common fine black (10YR 2/1) iron and manganese accumulations; strongly acid; gradual smooth boundary.

B23t—28 to 39 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct yellowish brown (10YR 5/6 and 5/8) and common medium faint grayish brown (10YR 5/2) mottles; weak medium prismatic structure parting to moderate medium and coarse subangular blocky; friable; common fine roots; continuous thin dark grayish brown (10YR 4/2) clay films and common coarse pale brown (10YR 6/3) uncoated silt and sand grains on faces of peds; common fine black (10YR 2/1) iron and manganese accumulations; strongly acid; gradual smooth boundary.

B31—39 to 55 inches; mixed dark yellowish brown (10YR 4/4), pale brown (10YR 6/3), and yellowish brown (10YR 5/6) silt loam; weak coarse prismatic structure; friable; few fine roots; common thin dark

grayish brown (10YR 4/2) and common moderately thick black (10YR 2/1) coatings on faces of peds; neutral; clear smooth boundary.

IIB32—55 to 60 inches; mixed brown (7.5YR 5/4), brown to dark brown (7.5YR 4/2), and strong brown (7.5YR 5/6) heavy silt loam; weak coarse prismatic structure; friable; continuous thin black (10YR 2/1) coatings on vertical faces of peds; neutral.

The solum ranges from 40 to more than 60 inches in thickness.

The color of the A horizon has hue of 10YR, value of 4 through 6, and chroma of 2 or 3. In areas where the A1 horizon is less than 6 inches thick, its color has value of 2 or 3 and chroma of 1 through 3. The B horizon is silt loam and silty clay loam. Its color has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 3 through 6.

Sable series

The Sable series consists of deep, poorly drained, moderately permeable soils that formed in loess or silty sediment. They are in upland depressions and drainageways and on stream terraces. The slope is 0 to 2 percent.

Sable soils are similar to Drummer and Selma soils, and they are near Muscatine, Elburn, Atterberry, and Virgil soils. Drummer and Selma soils have more sand in the solum than Sable soils. Sable soils are more poorly drained than Muscatine, Elburn, Atterberry, and Virgil soils. They have less sand in the solum than Elburn and Virgil soils.

Typical pedon of Sable silty clay loam, 1,420 feet south and 715 feet west of the northeast corner of sec. 18, T. 46 N., R. 4 E.

Ap—0 to 10 inches; black (10YR 2/1) silty clay loam; weak medium subangular blocky structure parting to moderate coarse granular; friable; many medium roots; neutral; abrupt wavy boundary.

A12—10 to 14 inches; mixed very dark gray (5Y 3/1) and black (10YR 2/1) silty clay loam; weak medium subangular blocky structure parting to moderate fine and medium granular; friable; common medium roots; mildly alkaline; clear smooth boundary.

B1g—14 to 17 inches; dark gray (5Y 4/1) silty clay loam; moderate medium subangular blocky structure; friable; common medium roots; mildly alkaline; clear smooth boundary.

B21g—17 to 23 inches; gray (5Y 5/1) silty clay loam; few fine distinct light olive brown (2.5Y 5/6) mottles; moderate fine prismatic structure parting to moderate fine and very fine subangular blocky; friable; common roots; very dark gray (10YR 3/1) fillings in worm channels; mildly alkaline; clear smooth boundary.

B22g—23 to 30 inches; gray (5Y 6/1) silty clay loam; few fine and medium distinct olive (5Y 5/6) mottles; moderate medium prismatic structure parting to moderate fine and very fine angular blocky; friable; few medium roots; very dark gray (10YR 3/1) fillings in worm channels; mildly alkaline; clear smooth boundary.

B23g—30 to 39 inches; gray (5Y 6/1) silty clay loam; common fine and medium distinct light olive brown (2.5Y 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; friable; few medium roots; common moderately thick gray (5Y 5/1) clay films on faces of peds; black (10YR 2/1) fillings in worm channels; mildly alkaline; clear smooth boundary.

B3g—39 to 52 inches; gray (5Y 6/1) light silty clay loam; many coarse prominent yellowish brown (10YR 5/6 and 5/8) mottles; weak coarse prismatic structure; friable; few medium roots; few black (10YR 2/1) iron and manganese concretions; dark gray (10YR 4/1) fillings in worm channels; mildly alkaline; clear smooth boundary.

Cg—52 to 60 inches; mixed gray (5Y 6/1) and yellowish brown (10YR 5/6) silt loam; massive; friable; few medium roots; common medium black (10YR 2/1) iron and manganese concretions; slight effervescence; mildly alkaline.

The solum is 40 to 60 inches thick, and the A horizon is 12 to 24 inches thick.

The color of the A horizon has hue of 10YR, 2.5Y, 5Y, and neutral; value of 2 or 3; and chroma of 0 or 1. The color of the B and C horizons has hue of 10YR, 2.5Y, 5Y, and neutral; value of 4 through 6; and chroma of 0 to 2.

Sawmill series

The Sawmill series consists of deep, poorly drained soils that formed in silty and clayey water-deposited sediment. Sawmill soils are on low stream terraces, in broad alluvial valleys, and in small upland drainageways. The slope is 0 to 2 percent. Permeability is moderate or moderately slow.

Sawmill soils are similar to Sable and Drummer soils, and they are near Comfrey, Orion, Lawson, and Palms soils. Sable and Drummer soils have a thinner mollic epipedon than Sawmill soils. Drummer soils have more sand in the lower part of the solum, and Comfrey soils have more sand throughout the solum than Sawmill soils. Orion and Lawson soils have more silt than Sawmill soils, and they are somewhat poorly drained. Unlike Sawmill soils, Orion soils do not have a mollic epipedon, and Palms soils have sapric material in the upper part of the solum.

Typical pedon of Sawmill silty clay loam, 530 feet south and 750 feet east of the northwest corner of sec. 21, T. 27 N., R. 10 E.

Ap—0 to 6 inches; black (10YR 2/1) silty clay loam; moderate fine granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

A12—6 to 11 inches; mixed very dark gray (10YR 3/1) and black (10YR 2/1) silty clay loam; moderate medium angular blocky structure; friable; common fine roots; slightly acid; abrupt smooth boundary.

A13—11 to 25 inches; black (10YR 2/1) heavy silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common fine roots; neutral; clear smooth boundary.

A3—25 to 29 inches; very dark gray (10YR 3/1) silty clay loam; moderate medium prismatic structure; friable; few fine roots; neutral; clear smooth boundary.

B2g—29 to 40 inches; dark gray (5Y 4/1) light silty clay loam; common fine distinct olive (5Y 5/4) mottles; weak coarse prismatic structure; friable; few fine roots; continuous thin very dark gray (10YR 3/1) clay films on faces of peds; neutral; gradual smooth boundary.

B3g—40 to 60 inches; dark gray (5Y 4/1) light silty clay loam; weak coarse prismatic structure; common fine distinct light olive brown (2.5Y 5/6) mottles; friable; few fine roots; few thin very dark gray (10YR 3/1) coatings on faces of peds; neutral.

The solum is 36 to 60 inches thick. The mollic epipedon is 24 to 36 inches thick.

The color of the A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The color of the B horizon has hue that ranges from 10YR to 5Y, value of 4 through 6, and chroma of 2 or less.

Saybrook series

The Saybrook series consists of deep, well drained, moderately permeable soils that formed in loess or silty material and the underlying glacial till. Saybrook soils are on glaciated uplands, mainly in Boone County. The slope ranges from 2 to 9 percent but is dominantly 2 to 5 percent.

Saybrook soils are similar to Parr, Miami, and Varna soils, and they are near Lisbon, Herbert, and Elburn soils. Parr and Miami soils have more sand in the solum than Saybrook soils, and Miami soils have a lighter colored A horizon. Saybrook soils are better drained than Lisbon, Herbert, and Elburn soils.

Typical pedon of Saybrook silt loam, 2 to 5 percent slopes, 250 feet north and 260 feet east of the southwest corner of sec. 36, T. 45 N., R. 4 E.

Ap—0 to 9 inches; very dark gray (10YR 3/1) silt loam; moderate very fine subangular blocky structure; friable; many fine roots; medium acid; abrupt smooth boundary.

A3—9 to 14 inches; dark brown (10YR 3/3) silt loam; weak medium platy structure parting to moderate fine granular; friable; many fine roots; thin discontinuous dark grayish brown clay films and scattered white (10YR 8/1) uncoated silt and sand grains on faces of peds; neutral; clear smooth boundary.

B21t—14 to 19 inches; dark yellowish brown (10YR 4/4) light silty clay loam; moderate very fine subangular blocky structure; friable; many fine roots; thin continuous brown (10YR 4/3) clay films; very dark gray (10YR 3/1) fillings in worm channels; scattered white (10YR 8/1) uncoated silt and sand grains on faces of peds; neutral; gradual smooth boundary.

B22t—19 to 28 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; firm; common fine roots; thin continuous brown (10YR 4/3) clay films; very dark gray (10YR 3/1) fillings in worm channels; scattered white (10YR 8/1) uncoated silt and sand grains on faces of peds; neutral; abrupt smooth boundary.

IIB23t—28 to 37 inches; brown (7.5YR 4/4) clay loam; common medium distinct grayish brown (7.5YR 5/2) mottles; moderate medium prismatic structure parting to moderate coarse angular blocky; firm; few fine roots; thin continuous brown (10YR 4/3) clay films and many thin pale brown (10YR 6/3) uncoated silt and sand grains on vertical faces of peds; many fine pebbles and stones; neutral; clear smooth boundary.

IIB24t—37 to 43 inches; brown (7.5YR 4/4) clay loam; moderate medium prismatic structure; firm; few fine roots; thin continuous brown (7.5YR 4/2) clay films on vertical faces of peds; many fine pebbles and stones; neutral; clear wavy boundary.

IIC—43 to 72 inches; brown (7.5YR 5/4) loam; massive; friable; thin dark brown (7.5YR 4/2) coatings in worm channels in upper 6 inches; many pebbles and stones; strong effervescence; moderately alkaline.

The solum is 24 to 45 inches thick. The loess or silty material is 18 to 40 inches thick.

The color of the A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. The color of the part of the B horizon that formed in loess has hue of 10YR, value of 4 or 5, and chroma of 3 through 6. The IIB horizon commonly is clay loam or loam. The IIC horizon is loam or silt loam. The color of the IIB and IIC horizons has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 through 6.

Selma series

The Selma series consists of deep, poorly drained soils that formed in loamy, water-laid deposits. Selma soils are in broad depressions, on stream terraces, and in narrow upland drainageways. The slope is 0 to 2

percent. Permeability is moderate in the solum and moderately rapid in the substratum.

Selma soils are similar to Drummer soils, and they are near La Hogue and Elburn soils. Drummer soils have less sand in the B horizon than Selma soils. La Hogue and Elburn soils are better drained than Selma soils.

Typical pedon of Selma loam, 70 feet north and 370 feet east of the southwest corner of sec. 35, T. 28 N., R. 11 E.

Ap—0 to 8 inches; black (N 2/0) heavy loam; cloddy structure parting to moderate medium granular; friable; common fine roots; neutral; abrupt smooth boundary.

A12—8 to 17 inches; black (10YR 2/1) clay loam; few medium distinct brown (7.5YR 4/2) mottles; moderate coarse granular structure; friable; few fine roots; neutral; clear smooth boundary.

B21g—17 to 27 inches; dark gray (5Y 4/1) clay loam; common medium distinct brown (7.5YR 4/2) mottles; moderate fine subangular blocky structure; friable; very dark gray (10YR 3/1) organic films on faces of peds; mildly alkaline; abrupt smooth boundary.

B22g—27 to 33 inches; gray (5Y 5/1) heavy loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to weak medium angular blocky; friable; few pebbles, 2 cm in diameter; mildly alkaline; clear smooth boundary.

B3—33 to 48 inches; light brownish gray (10YR 6/2) sandy loam; few fine prominent yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; friable; dark gray (10YR 4/1) clay flows around pebbles and in channels; common pebbles, 2 to 5 cm in diameter; weak effervescence; mildly alkaline; abrupt smooth boundary.

C—48 to 60 inches; light brownish gray (10YR 6/2) sand; single grained; loose; thin strata of gray (5Y 5/1) fine sand; weak effervescence; mildly alkaline.

The solum is 35 to 55 inches thick.

The Ap and A12 horizons range from silt loam to clay loam. Their color has hue of 10YR, 5Y, or neutral; value of 2 or 3; and chroma of 0 through 2. The B horizon typically is clay loam, but the range includes sandy loam, loam, and sandy clay loam. The color of the B horizon has hue of 10YR, 2.5Y, or 5Y; value of 4 through 6; and chroma of 1 or 2. The C horizon typically is sand or loamy sand and commonly has strata of other textures.

Sogn series

The Sogn series consists of shallow, somewhat excessively drained, moderately permeable soils that formed in residuum of dolomite. Sogn soils are on convex ridges, side slopes, and escarpments. The slope ranges from 4 to 30 percent.

The Sogn soils in this survey area are outside the range for the series because of the more humid climate and the underlying fractured bedrock; however, these differences do not affect the use or behavior characteristics of these soils unless they are used as woodland.

Sogn soils are similar to Rockton and Edmund soils, and they are near Griswold and Winnebago soils. Rockton soils have a thicker solum, and Edmund soils have more clay in their solum than Sogn soils. Unlike Sogn soils, Griswold soils formed in glacial till. Sogn soils are shallower than Winnebago soils, which formed in glacial drift.

Typical pedon of Sogn silt loam, 4 to 12 percent slopes, 2,560 feet north and 570 feet west of the center of sec. 32, T. 27 N., R. 10 E.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam; moderate medium granular structure; friable; many fine roots; mildly alkaline; abrupt smooth boundary.

A12—8 to 10 inches; very dark grayish brown (10YR 3/2) silt loam; moderate medium granular structure; friable; common fine roots; mildly alkaline; abrupt smooth boundary.

R—10 inches; fractured dolomite bedrock.

The thickness of the solum and the depth to dolomite bedrock are 4 to 20 inches (fig. 12). In many pedons, this soil has free carbonates and fragments of dolomite.

The A horizon is silt loam, loam, sandy loam, clay loam, or silty clay loam. Its color has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 1 through 3.

St. Charles series

The St. Charles series consists of deep, well drained, moderately permeable soils that formed in loess or silty sediment and in the underlying glacial outwash or sandy loam till. St. Charles soils are on upland drainage divides and foot slopes, on outwash plains, and on stream terraces. The slope ranges from 0 to 9 percent.

St. Charles soils are similar to Fayette, Rozetta, and Flagg soils, and they are near Kendall and Virgil soils. Unlike St. Charles soils, Fayette and Rozetta soils formed entirely in loess or silty sediment, and Flagg soils are reddish in the lower part of the solum, which formed in glacial till. St. Charles soils are better drained than Kendall and Virgil soils.

Typical pedon of St. Charles silt loam, 0 to 2 percent slopes, 450 feet south and 50 feet west of the center of sec. 21, T. 44 N., R. 3 E.

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine granular structure; friable; many roots; neutral; abrupt smooth boundary.

A2—10 to 14 inches; brown (10YR 5/3) silt loam; weak thin platy structure; friable; many roots; neutral; abrupt smooth boundary.

Figure 12.—Profile of Sogn silt loam showing the underlying dolomitic limestone.

B1—14 to 19 inches; brown (10YR 5/3) light silty clay loam; moderate very fine subangular blocky structure; friable; many roots; neutral; clear smooth boundary.

B21t—19 to 26 inches; yellowish brown (10YR 5/4) silty clay loam; moderate very fine subangular blocky structure; firm; common roots; thin continuous brown (10YR 5/3) clay films on faces of peds; neutral; abrupt smooth boundary.

B22t—26 to 38 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine subangular blocky structure; firm; common roots; thin continuous brown (10YR 5/3) clay films and patchy very dark gray (10YR 3/1) organic coatings on faces of peds; medium acid; abrupt smooth boundary.

B23t—38 to 46 inches; yellowish brown (10YR 5/4) light silty clay loam; moderate medium subangular blocky structure; firm; few roots; many sand grains; thin continuous brown (10YR 5/3) films on vertical faces of peds; few fine iron-manganese accumulations; medium acid; abrupt smooth boundary.

IIB31—46 to 49 inches; dark yellowish brown (10YR 4/4) light clay loam; moderate medium prismatic structure; firm; patchy brown (10YR 4/3) films on faces of peds; neutral; clear smooth boundary.

IIB32—49 to 60 inches; yellowish brown (10YR 5/4) sandy clay loam; moderate medium prismatic structure; firm; some fine gravel; patchy dark yellowish brown (10YR 4/4) films on faces of peds; neutral.

The solum ranges from 45 to more than 60 inches in thickness. The loess or silty sediment is 40 to 60 inches thick.

The color of the Ap or A1 horizon has hue of 10YR, value of 3 or 4, and chroma of 2. The color of the A2 horizon has hue of 10YR, value of 4 through 6, and chroma of 2 or 3. The B horizon is silt loam or silty clay loam. The color of the B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. The IIB horizon is loam, clay loam, or sandy clay loam. The IIC horizon is stratified outwash material or glacial till.

Stronghurst series

The Stronghurst series consists of deep, somewhat poorly drained soils that formed in loess or silty sediment. Stronghurst soils are in depressions on uplands and terraces. The slope is 0 to 3 percent. Permeability is moderate or moderately slow.

Stronghurst soils are similar to Kendall and Atterberry soils, and they are near Rozetta, Flagg, and Sable soils. Unlike Stronghurst soils, Kendall soils formed in glacial outwash. Atterberry soils have a darker colored surface horizon than Stronghurst soils. Stronghurst soils are not so well drained as Rozetta or Flagg soils. Unlike Stronghurst soils, Flagg soils formed in glacial drift. Stronghurst soils are better drained than Sable soils, which have a darker colored A horizon.

Typical pedon of Stronghurst silt loam, 1,700 feet south and 500 feet west of the northeast corner of sec. 36, T. 46 N., R. 3 E.

Ap—0 to 9 inches; dark gray (10YR 4/1) silt loam; cloddy structure parting to moderate medium granular; friable; many fine roots; neutral; abrupt smooth boundary.

A2—9 to 12 inches; grayish brown (2.5Y 5/2) silt loam; moderate medium platy structure; friable; common fine roots; dark gray (10YR 4/1) fillings in worm channels; light gray (10YR 7/1) uncoated silt and sand grains on faces of peds; few black (10YR 2/1) iron-manganese accumulations; neutral; abrupt smooth boundary.

B21t—12 to 18 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure parting to moderate fine and very fine subangular blocky; friable; common fine roots; many thin light brownish gray (2.5Y 6/2) clay films on faces of peds; medium acid; clear smooth boundary.

B22t—18 to 32 inches; yellowish brown (10YR 5/4) silty clay loam; common fine and medium distinct yellowish brown (10YR 5/6 to 5/8) mottles; weak medium prismatic structure parting to moderate fine subangular blocky; friable; common fine roots; continuous thin grayish brown (2.5Y 5/2) clay films on faces of peds; dark gray (10YR 4/1) krotovinas; slightly acid; clear smooth boundary.

B23t—32 to 41 inches; light grayish brown (2.5Y 6/2) silty clay loam; many fine and medium distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; continuous thin gray (5Y 5/1) clay films on faces of peds; common black (N 2/0) iron-manganese accumulations; neutral; clear smooth boundary.

B3—41 to 50 inches; yellowish brown (10YR 5/6), light brownish gray (2.5Y 6/2), and dark gray (10YR 4/1) silt loam; weak coarse prismatic structure; friable; few fine roots; many black (N 2/0) iron-manganese accumulations; neutral; clear smooth boundary.

C—50 to 66 inches; light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/4 and 5/6) silt loam; massive; friable; many secondary lime concretions; common black (N 2/0) iron-manganese accumulations; slight effervescence; mildly alkaline.

The solum is 40 to 60 inches or more thick.

The color of the Ap horizon has hue of 10YR, value of 4 through 6, and chroma of 1 or 2. The color of the A2 horizon has hue of 2.5Y or 10YR, value of 4 or 5, and chroma of 2. The B horizon is silty clay loam or silt loam. Its color has hue of 2.5Y or 10YR, value of 4 through 6, and chroma of 2 through 6.

Tama series

The Tama series consists of deep, well drained, moderately permeable soils that formed in loess. Tama soils are on uplands. The slope ranges from 0 to 9 percent.

Tama soils are similar to Downs, Plano, and Ogle soils, and they are near Muscatine and Elburn soils. Downs soils have a thinner surface horizon than Tama soils. Unlike Tama soils, Plano soils formed in loess and the underlying glacial outwash, and Ogle soils formed in loess and the underlying glacial drift. Tama soils are better drained than Muscatine soils. They are also better drained than Elburn soils, which formed in loess and the underlying glacial outwash.

Typical pedon of Tama silt loam, 2 to 5 percent slopes, 880 feet south and 1,540 feet west of the northeast corner of sec. 9, T. 26 N., R. 11 E.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam; moderate fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

A12—8 to 13 inches; very dark grayish brown (10YR 3/2) silt loam; moderate medium granular structure; friable; common fine roots; neutral; clear smooth boundary.

B1—13 to 22 inches; brown (10YR 4/3) light silty clay loam; moderate fine subangular blocky structure; friable; common fine roots; continuous thin dark brown (10YR 3/3) clay films on faces of peds; medium acid; clear smooth boundary.

B21t—22 to 29 inches; brown (10YR 4/3) silty clay loam; strong fine subangular blocky structure; friable; common fine roots; continuous thin dark brown (10YR 3/3) clay films on faces of peds; many moderately thick light gray (10YR 7/1) uncoated silt and sand grains on vertical faces of peds; medium acid; clear smooth boundary.

B22t—29 to 40 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; common fine roots; continuous thin dark brown (10YR 3/3) clay films and many moderately thick light gray (10YR 7/1) uncoated silt and sand grains on vertical faces of peds; few fine iron-manganese accumulations; slightly acid; clear smooth boundary.

B3—40 to 49 inches; yellowish brown (10YR 5/4) light silty clay loam; weak coarse prismatic structure parting to moderate medium to coarse angular blocky; friable; few fine roots; continuous thin dark brown (10YR 3/3) clay films on vertical faces of peds; slightly acid; clear smooth boundary.

C—49 to 70 inches; mixed brown (10YR 5/3) and yellowish brown (10YR 5/4) silt loam; massive; friable; few fine roots; slightly acid.

The solum is 36 to 60 or more inches thick. The soil is less than 10 percent sand.

The A horizon is silt loam or silty clay loam. Its color has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The B horizon is silty clay loam or silt loam. Its color has hue of 10YR, value of 3 through 5, and chroma of 2 through 4.

Troxel series

The Troxel series consists of deep, well drained, moderately permeable soils that formed in silty material. Troxel soils are in small drainageways, on foot slopes, and in closed depressions. The slope is 0 to 3 percent.

Troxel soils are similar to Tama and Jasper soils, and they are near Muscatine and Sable soils. Tama soils have a thinner A horizon than Troxel soils. Jasper soils have more sand in their solum than Troxel soils, and they formed in glacial outwash. Troxel soils are better drained than Muscatine soils, which formed in deep loess. They are also better drained than poorly drained Sable soils, which formed in deep loess.

Typical pedon of Troxel silt loam, 920 feet north and 40 feet west of the center of sec. 35, T. 45 N., R. 1 E.

Ap—0 to 8 inches; black (10YR 2/1) silt loam; massive; friable; many fine roots; neutral; abrupt smooth boundary.
A12—8 to 22 inches; black (10YR 2/1) silt loam; moderate medium and thick platy structure; friable; common fine roots; neutral; abrupt smooth boundary.
A13—22 to 31 inches; dark brown (10YR 3/3) silt loam; weak medium platy structure parting to weak medium and coarse granular; friable; few fine roots; few very dark gray (10YR 3/1) fillings in worm channels; neutral; clear smooth boundary.
B21t—31 to 47 inches; brown (10YR 4/3) light silty clay loam; weak fine prismatic structure; friable; few fine roots; thin dark grayish brown (10YR 4/2) clay films on faces of peds; common very dark gray (10YR 3/1) fillings in worm channels; neutral; clear smooth boundary.
B22t—47 to 58 inches; brown (10YR 5/3) light silty clay loam; many fine distinct yellowish brown (10YR 5/6 to 5/8) mottles; moderate medium angular blocky structure; friable; common thin dark grayish brown (10YR 4/2) clay films on faces of peds; common black (10YR 2/1) iron-manganese accumulations; neutral; clear smooth boundary.
B3—58 to 67 inches; yellowish brown (10YR 5/4) silt loam; many medium distinct yellowish brown (10YR 5/6 to 5/8) and grayish brown (10YR 5/2) mottles; moderate coarse angular blocky structure; friable; few thin dark grayish brown (10YR 4/2) clay films on faces of peds; neutral.

The solum ranges from 5 feet to more than 10 feet thick. The mollic epipedon is 24 to 45 inches thick.

The color of the A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. The upper part of the B horizon is silt loam or silty clay loam, and the lower part is clay loam, gravelly clay loam, or stratified loamy material. The color of the B horizon has hue of 10YR, value of 3 through 5, and chroma of 3 through 6.

Varna series

The Varna series consists of deep, moderately well drained soils that formed in loess and the underlying silty clay loam glacial till. Permeability is moderately slow in the upper part of the pedon and slow in the lower part. Slope ranges from 2 to 6 percent.

Varna soils are similar to Parr soils, and they are near Elliott and Andres soils. Parr soils have less clay in the B horizon than Varna soils. Andres and Elliott soils are somewhat poorly drained.

Typical pedon of Varna silt loam, 2 to 6 percent slopes, 808 feet south and 108 feet east of the northwest corner of sec. 25, T. 43 N., R. 2 E.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; friable; neutral; abrupt smooth boundary.
B1—10 to 15 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure parting to moderate fine granular; friable; common fine roots; continuous thin very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.
IIB21t—15 to 20 inches; brown (10YR 4/3) silty clay loam; weak and moderate fine subangular blocky structure; friable; common fine roots; continuous thin very dark grayish brown (10YR 3/2) clay films on faces of peds; few pebbles, 2 to 10 mm in diameter; neutral; clear smooth boundary.
IIB22t—20 to 27 inches; brown (10YR 4/3) light silty clay loam; moderate medium angular blocky structure; firm; common fine roots; continuous thin very dark gray (10YR 3/1) clay films on faces of peds; few pebbles, 1 to 2 mm in diameter; neutral; clear smooth boundary.
IIB3—27 to 35 inches; brown (10YR 5/3) silty clay loam; many common distinct grayish brown (2.5Y 5/2) and common medium distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; friable; common fine roots; many thin very dark grayish brown (10YR 3/2) clay films on faces of peds; few pebbles, 1 to 2 mm in diameter; moderately alkaline; clear smooth boundary.
IIC—35 to 60 inches; mixed grayish brown (10YR 5/2) and yellowish brown (10YR 5/4) silty clay loam; common medium prominent yellowish brown (10YR 5/6) and common medium faint grayish brown (2.5Y 5/2) mottles; massive; friable; few pinkish white (10YR 8/2, dry) uncoated silt and sand grains on faces of peds; common black (10YR 2/1) iron and manganese concretions; moderately alkaline.

The solum is 3 to 4 feet thick.

The A horizon typically is heavy silt loam, but it ranges in texture to light silty clay loam in the A3 horizon. Its color has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The B horizon is silty clay loam or clay. Its color has hue of 10YR, 2.5Y, or 5Y; has value of 4 through 6; and has chroma of 3 or 4 in the upper part and 1 through 4 in the lower part. The C horizon is calcareous silty clay loam or clay loam till.

Virgil series

The Virgil series consists of deep, somewhat poorly drained soils that formed in loess 40 to 60 inches thick and the underlying loamy outwash or till. Virgil soils are

on stream terraces and in low areas on uplands. The slope is 0 to 3 percent. Permeability is moderate or moderately slow.

Virgil soils are similar to Elburn soils, and they are near Sable, Drummer, and Plano soils. Unlike Virgil soils, Elburn soils have a mollic epipedon, and Sable and Drummer soils are poorly drained. Plano soils are better drained than Virgil soils.

Typical pedon of Virgil silt loam, 1,620 feet east and 90 feet north of the southwest corner of sec. 35, T. 44 N., R. 2 E.

Ap—0 to 7 inches; very dark gray (10YR 3/1) silt loam; moderate fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

A2—7 to 15 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine granular structure; friable; many fine roots; few light gray (10YR 7/2) uncoated silt and sand grains on faces of peds; neutral; abrupt smooth boundary.

B21t—15 to 25 inches; light olive brown (2.5Y 5/4) silty clay loam; common fine prominent strong brown (7.5YR 5/8) and few fine faint grayish brown (2.5Y 5/2) mottles; moderate fine angular blocky structure; friable; many fine roots; thin continuous reddish brown (2.5Y 5/4) clay films and few light gray (10YR 7/2) uncoated silt and sand grains on faces of peds; few black (5YR 2/1) iron-manganese concretions; medium acid; clear smooth boundary.

B22tg—25 to 36 inches; grayish brown (2.5Y 5/2) silty clay loam; many fine prominent yellowish brown (10YR 5/6 to 5/8) mottles; moderate medium angular blocky structure; firm; common fine roots; few dark brown (7.5YR 3/2) clay films and few uncoated silt and sand grains on faces of peds; many black (5YR 2/1) iron-manganese concretions; medium acid; gradual smooth boundary.

B23tg—36 to 46 inches; olive gray (5Y 5/2) light silty clay loam; common fine faint light olive brown (2.5Y 5/6) mottles; moderate medium prismatic structure; friable; few roots; dark grayish brown (10YR 4/2) clay films on faces of peds; medium acid; abrupt smooth boundary.

IIB3—46 to 54 inches; mixed light olive brown (2.5Y 5/4) and dark grayish brown (10YR 4/2) sandy loam; moderate medium platy structure; friable; few very dark gray (10YR 3/1) clay films on faces of peds; many fine sand grains; neutral; abrupt smooth boundary.

IICg—54 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; common medium faint light olive brown (2.5Y 5/6) mottles; massive; friable; few fine lime concretions; few fine pebbles; strong effervescence; moderately alkaline.

The solum ranges from 48 to more than 60 inches in thickness.

The color of the A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The B horizon is silty clay loam in the upper part and sandy loam, silt loam, or clay loam in the lower part. Its color has hue of 10YR, 2.5Y, or 5Y, has value of 4 through 6, and has chroma of 2 or 3 in the upper part and 4 in the lower part. The C horizon is stratified outwash or till material.

Warsaw series

The Warsaw series consists of deep, well drained soils that formed in loamy outwash overlying calcareous sand and gravel. Warsaw soils are on terrace flats and convex side slopes of gravelly kames and eskers on uplands. The slope ranges from 0 to 9 percent. Permeability is moderate in the solum and very rapid in the substratum.

Warsaw soils are similar to Hononegah soils, and they are near Jasper, Wea, and Rodman soils. Hononegah soils have more sand in the solum than Warsaw soils. Warsaw soils have a thinner solum than Jasper soils, which formed in glacial outwash. They also have a thinner solum than Wea soils, which formed in calcareous sand and gravel. Warsaw soils have a thicker solum than Rodman soils, which formed in calcareous sand and gravel.

Typical pedon of Warsaw loam, 0 to 2 percent slopes, 2,490 feet north and 100 feet west of the southeast corner of sec. 17, T. 45 N., R. 2 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) loam; moderate fine granular structure; friable; common medium roots; neutral; abrupt smooth boundary.

A12—8 to 12 inches; very dark grayish brown (10YR 3/2) loam; moderate fine subangular blocky structure; friable; common medium roots; neutral; abrupt smooth boundary.

B21t—12 to 22 inches; very dark grayish brown (10YR 3/2) loam; moderate medium subangular blocky structure; friable; few fine roots; medium acid; clear smooth boundary.

B22t—22 to 30 inches; brown (10YR 4/3) heavy loam; moderate medium subangular blocky structure; friable; few fine roots; medium acid; abrupt smooth boundary.

B3—30 to 36 inches; dark reddish brown (5YR 3/2) gravelly loam; weak coarse prismatic structure; very friable; very dark grayish brown (10YR 3/2) coatings on gravel; slightly acid; abrupt smooth boundary.

IIC—36 to 60 inches; yellowish brown (10YR 5/6) sand and gravel; single grained; loose; strong effervescence; moderately alkaline.

The thickness of the solum, the depth to free carbonates, and the depth to sand and gravel are 24 to 40 inches. The content of coarse fragments is 0 to 5 percent in the subsoil and 1 to 5 percent in the substratum.

The A horizon is silt loam, loam, or sandy loam. Its color has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 1 or 2. The B horizon is sandy clay loam, loam, clay loam, gravelly clay loam, gravelly loam, or gravelly sandy clay loam. Its color has hue of 10YR, 7.5YR, or 5YR; value of 3 through 5; and chroma of 2 through 4.

Waupecan series

The Waupecan series consists of deep, well drained soils that formed in loess and the underlying calcareous sand and gravel. Waupecan soils are on stream terraces. The slope is 0 to 3 percent. Permeability is moderate in the solum and very rapid in the substratum.

Waupecan soils are similar to Plano soils, and they are near Troxel soils. Unlike Waupecan soils, Plano soils are underlain by loamy material. Troxel soils are in depressions and have a thicker mollic epipedon than Waupecan soils.

Typical pedon of Waupecan silt loam, 720 feet south and 1,500 feet east of the northwest corner of sec. 7, T. 44 N., R. 4 E.

Ap—0 to 9 inches; very dark gray (10YR 3/1) silt loam; weak very fine and fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

A12—9 to 15 inches; very dark grayish brown (10YR 3/2) heavy silt loam, grayish brown (10YR 5/2), dry; moderate very fine and fine subangular blocky structure parting to very fine granular; friable; common fine roots; neutral; clear smooth boundary.

B1—15 to 21 inches; brown (10YR 4/3) heavy silt loam; moderate very fine and fine subangular blocky structure; friable; common fine roots; slightly acid; clear smooth boundary.

B21t—21 to 31 inches; brown (10YR 4/3) silty clay loam; moderate fine and medium subangular blocky structure; friable; common fine roots; medium acid; clear smooth boundary.

B22t—31 to 41 inches; brown (10YR 4/3) silty clay loam; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few fine roots; medium acid; abrupt smooth boundary.

IIB23—41 to 51 inches; brown (10YR 4/3) loam; moderate medium prismatic structure; friable; few fine roots; few fine pebbles; medium acid; abrupt smooth boundary.

IIC1—51 to 59 inches; brown (10YR 4/3) gravelly coarse sand; single grained; loose; few pebbles, 1/2 inch in diameter; neutral; abrupt smooth boundary.

IIC2—59 to 65 inches; dark reddish brown (5YR 3/4) gravelly coarse sand; massive; friable; few pebbles, 1/2 inch in diameter; neutral.

The solum is 40 to 60 inches thick.

The color of the Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The IIB horizon ranges from loam to gravelly loamy sand that is about 10 percent or more gravel in some places. Its color has hue of 10YR, 7.5YR, or 5YR; value of 3 through 5; and chroma of 2 through 4. The IIC horizon ranges from very gravelly sandy loam to sand and gravel.

Wea series

The Wea series consists of deep, well drained soils that formed in silty and loamy sediment and the underlying sand and gravel. Wea soils are on stream terraces. The slope ranges from 0 to 5 percent. Permeability is moderate in the solum and very rapid in the substratum.

Wea soils are similar to Dakota, Waupecan, and Jasper soils, and they are near Warsaw and Troxel soils. Waupecan soils have less sand in the upper part of the B horizon than Wea soils. Unlike Wea soils, Jasper soils do not have calcareous sand and gravel within a depth of 5 feet, and Warsaw and Dakota soils have contrasting textures. Troxel soils are in depressions and have a thicker mollic epipedon than Wea soils.

Typical pedon of Wea silt loam, 0 to 2 percent slopes, 1,780 feet east and 560 feet north of the southwest corner of SW1/4 of sec. 3, T. 43 N., R. 1 E.

Ap—0 to 8 inches; very dark brown (10YR 2/2) silt loam; about 15 percent sand; moderate fine granular structure; friable; many fine roots; neutral; clear smooth boundary.

A12—8 to 15 inches; very dark grayish brown (10YR 3/2) silt loam; about 20 percent sand; moderate fine granular structure; friable; many fine roots; continuous thin very dark brown (10YR 2/2) organic coatings on faces of peds; neutral; clear smooth boundary.

IIB21—15 to 22 inches; brown (10YR 4/3) light clay loam; moderate fine subangular blocky structure; many fine roots; continuous thin very dark brown (10YR 2/2) organic coatings on faces of peds; medium acid; clear smooth boundary.

IIB22t—22 to 31 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine prismatic structure parting to moderate fine subangular blocky; friable; many fine roots; many thin brown (10YR 4/3) clay films and light gray (10YR 7/1, dry) uncoated silt and sand grains on faces of peds; strongly acid; clear smooth boundary.

IIB23t—31 to 43 inches; brown (7.5YR 4/4) sandy loam; weak coarse prismatic structure; friable; common fine roots; patchy thin dark grayish brown (10YR 4/2) clay films on faces of peds; strongly acid; clear smooth boundary.

IIIB3—43 to 58 inches; mixed brown (7.5YR 4/2) and dark grayish brown (10YR 4/2) gravelly sandy clay loam; weak coarse prismatic structure; very friable;

few fine roots in upper part; medium acid; clear smooth boundary.

IIIC—58 to 60 inches; mixed brown (10YR 5/3) and yellowish brown (10YR 5/4) sand and gravel; single grained; loose; moderately alkaline.

The solum ranges from 40 to more than 60 inches in thickness.

The Ap and A12 horizons typically are silt loam, but they range to include loam. Their color has hue of 10YR, value of 2 or 3, and chroma of 1, 2, or 3. The Bt horizon commonly is clay loam. In some pedons, individual horizons of heavy silt loam, silty clay loam, or clay loam are in the upper part of the B horizon, and horizons of gravelly clay loam, clay, gravelly clay, sandy loam, or loamy sand are in the lower part. The color of the B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 through 6. Horizons of loamy sand are below a depth of 40 inches.

Westville series

The Westville series consists of deep, well drained, moderately permeable soils that formed in a thin mantle of loess over an exhumed paleosol that formed in glacial till. Westville soils are on upland interfluves and side slopes. Slope ranges from 2 to 15 percent.

Westville soils are similar to Winnebago, Pecatonica, and Kidder soils, and they are near Whalan and NewGlarus soils. Winnebago soils have a higher content of organic matter in the surface horizon and are darker than Westville soils. Pecatonica soils have less sand and more silt in the solum. Kidder soils have a thinner solum and are shallower to calcareous sandy loam glacial till than Westville soils. Unlike Westville soils, Whalan soils formed in residuum of dolomite, and NewGlarus soils formed in loess and the underlying residuum of dolomite.

Typical pedon of Westville silt loam, 2 to 5 percent slopes, 600 feet north and 2,474 feet west of the center of sec. 4, T. 26 N., R. 10 E.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; moderate medium granular structure; friable; few pebbles, 5mm in diameter; slightly acid; abrupt smooth boundary.

B21t—8 to 15 inches; brown (7.5YR 4/4) light clay loam; moderate medium subangular blocky structure; friable; few thin dark reddish brown (5YR 3/3) clay films on faces of peds; several pebbles, 1 cm in diameter; very dark grayish brown (10YR 3/2) krotovina, 2 cm in diameter; neutral; clear smooth boundary.

B22t—15 to 21 inches; reddish brown (5YR 4/4) clay loam; moderate medium subangular blocky structure; firm; few thin brown (7.5YR 4/2) clay films on faces of peds; several stones, 1 to 3 cm in diameter; few thin black (N 2/0) iron and manganese coatings on faces of peds; neutral; clear smooth boundary.

B23t—21 to 38 inches; yellowish red (5YR 4/6) heavy clay loam; strong medium angular and subangular blocky structure; firm; many thin reddish brown (5YR 4/3) clay films on faces of peds; many moderately thick black (N 2/0) iron and manganese coatings on faces of peds; neutral; clear smooth boundary.

B24t—38 to 44 inches; reddish brown (5YR 4/4) clay loam; moderate medium subangular blocky structure; firm; few thin reddish brown (5YR 4/3) clay films on faces of peds; common thin black (N 2/0) iron and manganese coatings on faces of peds; several pebbles, 3 cm in diameter; strongly acid; clear smooth boundary.

B25t—44 to 50 inches; brown (7.5YR 4/4) clay loam; moderate medium prismatic structure parting to moderate medium and coarse subangular blocky; friable; few thin reddish brown (5YR 4/3) and yellowish red (5YR 4/6) clay films on faces of peds; several pebbles, 1 to 2 cm in diameter; strongly acid; clear smooth boundary.

B31—50 to 60 inches; light yellowish brown (10YR 6/4) and brown (7.5YR 4/4) sandy clay loam; weak and moderate medium and coarse prismatic structure parting to moderate medium subangular blocky; friable; few pebbles, 1 to 3 cm in diameter; medium acid.

The solum is 60 to 84 inches thick.

In uncultivated areas, the A1 horizon is silt loam or loam. Its color has hue of 10YR, value of 2 or 3, and chroma of 2. Some pedons have an A2 horizon. The color of the A2 horizon has hue of 10YR, value of 4 through 6, and chroma of 2 through 4. The color of the Ap horizon generally has value of 4 and chroma of 2 or 3. The B horizon ranges from heavy clay loam or sandy clay loam in the upper part to heavy sandy loam or light clay loam in the lower part. Its color has hue of 10YR, 7.5YR, or 5YR, value of 3 through 6, and chroma of 3 or 4.

Whalan series

The Whalan series consists of moderately deep, well drained soils that formed in a thin mantle of loess, the underlying glacial drift, and the underlying residuum of dolomite. Whalan soils are on convex ridges and side slopes on glaciated uplands in Winnebago County. They are mapped only in an undifferentiated group with NewGlarus soils. The slope ranges from 2 to 15 percent. Permeability is moderate in the upper part of the pedon and slow in the lower part.

Whalan soils are similar to Palsgrove, Dunbarton, and NewGlarus soils, and they are near Pecatonica and Westville soils. Palsgrove soils have a thicker solum, Dunbarton soils have less sand in their solum and are

shallower to dolomite, and NewGlarus soils have more clay in their solum than Whalan soils. Unlike Whalan soils, the well drained Pecatonica soils formed in a thin mantle of loess and a paleosol that formed in glacial drift, and Westville soils formed in a thin mantle of loess over an exhumed paleosol that formed in glacial till. Westville soils are in the same positions on the landscape as Whalan soils.

Typical pedon of Whalan silt loam in an area of Whalan and NewGlarus silt loams, 5 to 9 percent slopes, eroded, on a convex side slope, 150 feet south and 952 feet west of the northeast corner of sec. 25, T. 29 N., R. 10 E.

Ap—0 to 4 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; many fine roots; neutral; clear smooth boundary.

B1—4 to 10 inches; brown (7.5YR 4/4) light silty clay loam; moderate fine subangular blocky structure; friable; many fine roots; light gray (10YR 7/2, dry) uncoated silt and sand grains on faces of peds; neutral; clear smooth boundary.

IIB21t—10 to 17 inches; brown (7.5YR 4/4) silty clay loam; a noticeable amount of sand; strong fine subangular blocky structure; friable; common fine roots; continuous moderately thick brown (7.5YR 4/2) clay films on vertical faces of peds; common black (N 2/0) iron stains; medium acid; clear smooth boundary.

IIB22t—17 to 26 inches; brown (7.5YR 4/4) sandy clay loam; moderate medium prismatic structure parting to strong medium angular blocky; friable; common fine roots; continuous moderately thick dark grayish brown (10YR 4/2) clay films and light gray (10YR 7/2, dry) uncoated silt and sand grains on faces of peds; strongly acid; clear smooth boundary.

IIB23t—26 to 33 inches; brown (7.5YR 4/4) sandy clay loam; weak coarse prismatic structure; friable; common fine roots; continuous thin brown (7.5YR 4/2) clay films and light gray (10YR 7/2, dry) uncoated silt and sand grains on faces of peds; common black (N 2/0) iron stains; slightly acid; clear smooth boundary.

IIIB24t—33 to 36 inches; strong brown (7.5YR 5/6) clay; moderate medium prismatic structure parting to moderate medium angular blocky; firm; few fine roots; continuous thin brown (7.5YR 4/2) clay films on vertical faces of peds; common black (N 2/0) iron stains; neutral; clear smooth boundary.

IIIR—36 inches; fractured dolomite bedrock.

The thickness of the solum and the depth to dolomite bedrock are 20 to 40 inches. The solum typically is 2 to 6 percent coarse fragments. In some pedons, the lower part of the solum is as much as 20 percent coarse fragments.

The Ap horizon is silt loam or loam. Its color has hue of 10YR, value of 2 through 4, and chroma of 1 through 3. The A2 horizon, if present, is silt loam or loam. Its color has hue of 10YR, value of 4 or 5, and chroma of 2. The B horizon is loam, silt loam, or silty clay loam, and the IIB horizon is silty clay loam, clay loam, or sandy clay loam. The color of the B and IIB horizons has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 through 6. The IIIB horizon is silty clay or clay. Its color has hue of 10YR, 7.5YR, or 5YR; value of 4 through 6; and chroma of 3 through 6.

Will series

The Will series consists of poorly drained soils that formed in loamy deposits over underlying calcareous sand and gravel. Will soils are on stream terraces. The slope is 0 to 2 percent. Permeability is moderate in the solum and rapid in the substratum.

Will soils are similar to Kane soils, and they are near Selma soils. Kane soils are better drained than Will soils. Selma soils have a thicker solum than Will soils and are not underlain by gravel.

Typical pedon of Will loam, 2,020 feet west and 85 feet north of the southeast corner of sec. 13, T. 43 N., R. 2 E.

Ap—0 to 8 inches; black (N 2/0) loam; moderate very fine granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

A12—8 to 14 inches; black (N 2/0) loam; moderate very fine and fine subangular blocky structure; friable; many fine roots; neutral; clear smooth boundary.

B1g—14 to 19 inches; dark grayish brown (10YR 4/2) loam; few fine prominent yellowish brown (10YR 5/8) mottles; moderate fine subangular blocky structure; friable; common fine roots; thin continuous black (10YR 2/1) clay films and organic films on faces of peds; black (N 2/0) fillings in worm channels; few fine iron-manganese concretions; neutral; clear smooth boundary.

B2tg—19 to 25 inches; grayish brown (10YR 5/2) sandy clay loam; few fine prominent yellowish brown (10YR 5/8) mottles; moderate fine and medium subangular blocky structure; friable; common fine roots; many thin dark grayish brown (2.5Y 4/2) clay films on faces of peds; black (N 2/0) fillings in worm channels; many fine pebbles; neutral; abrupt smooth boundary.

B3g—25 to 28 inches; mixed dark grayish brown (10YR 4/2) and black (10YR 2/1) sandy loam; massive; very friable; few fine roots; many fine pebbles; slight effervescence; mildly alkaline; abrupt smooth boundary.

IIC1—28 to 32 inches; brown (10YR 5/3) gravelly sand; single grained; loose; few small spots of dark red-

dish gray (5YR 4/2); strong effervescence; moderately alkaline; abrupt smooth boundary.

IIC2—32 to 36 inches; dark grayish brown (10YR 4/2) gravelly sandy loam; massive; friable; three 1/4-inch layers of black (10YR 2/1) sandy loam; strong effervescence; moderately alkaline; abrupt smooth boundary.

IIC3—36 to 60 inches; mixed brown (10YR 5/3) and light brownish gray (10YR 6/2) sand and gravel; single grained; loose; strong effervescence; moderately alkaline.

The solum is 24 to 40 inches thick.

The A horizon is loam or silt loam. Its color has hue of 10YR or neutral, value of 2 or 3, and chroma of 1 or 2. The B horizon ranges in texture from sandy loam to sandy clay loam. Its color has hue of 10YR, value of 4 or 5, and chroma of 1 or 2.

Winnebago series

The Winnebago series consists of deep, well drained, moderately permeable soils that formed in a thin mantle of loess and the underlying reddish paleosol that formed in sandy loam glacial drift. Winnebago soils are on convex ridges and knolls on uplands. The slope ranges from 2 to 15 percent.

Winnebago soils are similar to Westville soils, and they are near Jasper and Hitt soils. Unlike Winnebago soils, Westville soils have a light colored A horizon. Jasper soils are underlain by loamy outwash material, and Hitt soils have fractured dolomitic limestone below a depth of 40 to 60 inches.

Typical pedon of Winnebago silt loam, 2 to 5 percent slopes, 405 feet east and 85 feet north of the southwest corner of sec. 11, T. 27 N., R. 11 E.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam; moderate medium granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

A12—10 to 15 inches; dark brown (7.5YR 3/2) silt loam; weak very fine subangular blocky structure parting to moderate medium granular; friable; common fine roots; few pebbles, 1 to 2 cm in diameter; strongly acid; clear smooth boundary.

B1—15 to 21 inches; brown (7.5YR 4/4) heavy loam; few fine distinct reddish brown (5YR 4/4) mottles (iron stains); moderate medium subangular blocky structure; friable; few fine roots; thin patchy dark brown (7.5YR 3/2) clay films on faces of peds; strongly acid; clear smooth boundary.

B21t—21 to 34 inches; reddish brown (5YR 4/4) clay loam; common medium faint yellowish red (5YR 4/6) mottles (iron stains); moderate medium subangular blocky structure; firm; few fine roots; thin patchy dark reddish brown (5YR 3/4) clay films on faces of peds; many pebbles, 1 to 2 cm in diameter; strongly acid; clear smooth boundary.

B22t—34 to 50 inches; strong brown (7.5YR 5/6) clay loam; weak coarse prismatic structure parting to weak medium and coarse subangular blocky; firm; few fine roots; thin patchy dark brown (7.5YR 3/2) clay films on faces of peds; reddish brown (5YR 4/4) iron stains; strongly acid; clear smooth boundary.

B31—50 to 66 inches; reddish brown (5YR 4/4) light clay loam; weak coarse prismatic structure; friable; dark reddish brown (5YR 3/4) clay films on pressure faces around pebbles; medium acid; abrupt smooth boundary.

B32—66 to 74 inches; reddish brown (5YR 4/4) sandy loam; massive; friable; dark reddish brown (5YR 3/4) clay films on pressure faces around pebbles; medium acid.

The solum ranges from 40 to more than 60 inches in thickness.

The A horizon typically is silt loam, but it ranges to include loam and sandy loam. Its color has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 1 through 3. The B horizon ranges from sandy loam to sandy clay loam. Its color has hue that ranges from 10YR to 5YR, value of 3 through 6, and chroma of 3 through 6.

Formation of the soils

In this section, the factors of soil formation are described, these factors are related to the formation of soils in the survey area, and the processes of soil formation are explained.

Factors of soil formation

Soil is produced by soil-forming processes that act on the material deposited or accumulated by geologic forces. The characteristics of the soil at any given time are determined by (1) the physical and mineralogical composition of the parent material, (2) the climate under which the soil material has accumulated and existed since accumulation, (3) the plant and animal life on and in the soil, (4) the relief, or lay of the land, and (5) the length of time the processes of soil formation have acted on the soil material.

Parent material

The parent material affects the mineralogical and chemical composition, the texture, and the structure of a soil. The parent materials of the soils in this survey area are: loess, glacial till, glacial outwash, stream alluvium, bedrock, organic material, windblown sand, and water-deposited gravel.

Peorian loess is one of the dominant parent materials in Winnebago and Boone Counties. In some areas, for example in the southwestern part of Winnebago County, this loess is more than 5 feet thick. The soils in these areas, including the Tama, Downs, and Muscatine soils, formed entirely in this silty, windblown material.

Many of the soils in the survey area formed in a loess mantle and an underlying material, such as glacial outwash or glacial till, which was deposited before the loess. Other soils formed in a loess mantle and the underlying residuum of dolomite.

Soils such as Ashdale and Palsgrove soils have a solum that formed in loess and the underlying residuum of bedrock. These soils have bedrock within a depth of 60 inches which is commonly referred to as the "preglacial surface." Some soils, such as Sogn soils, have little or no loess cover and thus are much shallower to the bedrock.

In many areas, the soils formed in loess and the underlying glacial drift or glacial till. Ringwood and McHenry soils formed in a layer of loess and the underlying Argyle sandy loam till of Wisconsin age. In areas where slopes are steeper and where the loess is thinner, the soils, for example Griswold and Kidder soils, formed almost entirely in the glacial till. In these areas, the influence of the loess on soil formation was minimal.

In some areas, the loess was deposited over an older eroded Sangamonian soil that formed in Illinoian till during an interglacial period. This older, reddish clay loam soil is called a paleosol; it formed in the Argyle till of Wisconsin age. In the broad, more nearly level upland areas, Ogle and Flagg soils formed in loess 3 to 4 feet thick over the paleosol. The Pecatonica and Argyle soils formed in the steeper, more dissected areas where the loess cap has been eroded or was not so deep. The Winnebago and Westville soils have an even thinner loess cap than the Pecatonica and Argyle soils. In these soils, almost the entire lower two-thirds of the profile formed in the paleosol and the underlying till.

In the southern and eastern parts of Boone County, soils such as Parr, Miami, and Odell soils formed in a thin loess mantle over the underlying Capron loam till. The Capron till is much younger than the Argyle till, which is found in the northern part of Boone County and south of the Pecatonica River in Winnebago County. In some small areas in Winnebago County, adjacent to Stephenson County, the soils formed in a loam till.

Esmund till is in the southeastern part of Winnebago County in areas south and west of the Kishwaukee River. This silty clay loam till is not extensive, and it is the youngest till that was deposited in the survey area. Varna and Elliott soils formed in a thin loess mantle and this underlying Esmund till.

Glacial melt waters also deposited outwash material on the uplands and along streams. Plano, Kendall, and Drummer soils formed in loess 3 to 4 feet thick and this underlying outwash material. In areas where the loess was thinner, soils such as Martinsville, Jasper, and Selma soils formed in a thin mantle of loess and the underlying outwash material.

Along streams and drainageways in the survey area, the soils formed in sediment that was deposited through the erosion of adjacent upland soils. Comfrey, Troxel, and Juneau soils formed in silty and loamy sediment that was deposited by water.

Small areas of organic, or muck soils are scattered throughout the survey area. Houghton and Adrian soils are organic soils that formed in bogs through the continual accumulation and decomposition of wetland plants.

Some of the soils in the central, northern, and western parts of Winnebago County formed in windblown or water-deposited sand. Flagler and Hononegah soils formed in this eolian sand on uplands and terraces. In the southern and central parts of Winnebago County, this eolian sand is underlain by silt. Friesland and Grellton soils formed in these areas.

Large deposits of sand and gravel are along the Rock River in Winnebago County and the Piscasaw River in Boone County. These gravel terraces are younger than the glacial tills in this survey area. Warsaw and Wea soils formed in material that was deposited over the calcareous gravel.

Climate

Climate affects soil formation through its influence on the rate at which the parent material is weathered and its influence in determining the natural vegetation. The climate in Winnebago and Boone Counties is continental and is typical of northern Illinois. This type of climate enhances rapid weathering and clay formation. The clay is moved downward through the profile by water so that the maximum accumulation of clay is in the subsoil. The climate, through its influence on vegetation, also affects the amount of organic matter that is returned to the soil.

Plants and animals

Plants have a greater influence on soil formation than animals; however, animals do influence soil formation. Animals that live in the soil, such as earthworms, mix the soil material and the organic matter. They are partly responsible for the granular structure of the surface layer of many of the soils in the survey area.

The soils in Winnebago and Boone Counties formed under forest and prairie vegetation. Soils that formed under prairie vegetation are darker and have more organic matter than soils that formed in woodland. Grasses return more organic matter to the soil through their fibrous root system than trees. In addition, the aboveground growth of grass that is returned to the soil is larger in quantity and is more evenly distributed than the leaves, twigs, or trunks of trees.

Relief and drainage

Relief influences the amount of runoff, the degree of erosion, and the amount of water that infiltrates and percolates through the soil. In areas where the soils formed in a uniform, permeable parent material such as loess, the natural drainage of the soil is largely determined by the slope. The moderately well drained and well drained soils are in the more rolling areas, and the somewhat poorly drained to very poorly drained soils are mainly on flats or in depressions. Drainage also affects the distribution of prairie and forest vegetation.

In areas where the slopes are steeper, the surface layer is continually being eroded. In this way, the soil is altered as the lower horizons are exposed and the organic matter is removed through erosion.

The slopes in Winnebago and Boone Counties range from 0 to 30 percent. In areas of heavier, less permeable soils, the steepness of slopes influences drainage to a lesser extent.

Winnebago and Boone Counties have large areas of poorly drained soils along drainageways and streams, in gently sloping upland areas, and on the steeper slopes along stream valleys.

Time

The length of time required for the formation of a soil depends on the other factors of soil formation. Soils that formed in a parent material that is low in content of lime develop more rapidly and become acid more readily than soils that formed in material that is high in content of lime. More rapidly permeable soils are leached of lime and other soluble minerals more quickly than slowly permeable soils. Soils develop more quickly under forest vegetation than under prairie vegetation because grasses are more efficient in recycling calcium and other bases from the subsoil to the surface layer than trees. Soils generally develop more quickly in a humid climate than in a dry climate. Soils generally are more strongly developed or have greater horizon differentiation if they have been exposed to the weathering process for a longer period of time. Clay gradually moves downward through the soil and accumulates in the subsoil over a long period of time.

Organic matter has accumulated in all the soils in the counties. The soils that formed under prairie vegetation have a thicker, darker surface layer than those that formed under forest vegetation. In the poorly drained soils, iron compounds have been reduced and moved downward through the soil; this results in a gray color in the subsoil. In places, this iron has accumulated as concretions, or small, rounded pellets. In the well drained soils, the iron compounds are oxidized and generally are more diffuse. These compounds impart a brown or yellowish brown color to the subsoil.

The upland soils that have a solum that formed in loess are more developed than the soils that formed in windblown sand. The alluvial soils along streams and rivers annually receive new sedimentary material; thus, they are relative young soils and have little development or horizon differentiation.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses.

Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	More than 12

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Broad-base terrace. A ridge-type terrace built to control erosion by diverting runoff along the contour at a nonscouring velocity. The terrace is 10 to 20 inches high and 15 to 30 feet wide and has gently sloping sides, a rounded crown, and a dish-shaped channel along the upper side. It may be nearly level or have a grade toward one or both ends.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

Chiseling. Tillage with an implement having one or more soil-penetrating points that loosen the subsoil and bring clods to the surface. A form of emergency tillage to control soil blowing.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. Mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping (or contour farming). Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms. The Lco horizon is a limnic layer that contains many fecal pellets.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Depth to rock. Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Esker (geology). A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Excess lime (in tables). Excess carbonates in the soil that restrict the growth of some plants.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 37.5 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Fragile (in tables). Soil material that is easily damaged by use or disturbance.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial melt water.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial melt water. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Green manure crop(agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only

after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame (geology). An irregular, short ridge or hill of stratified glacial drift.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous areas. Areas that have little or no natural soil and support little or no vegetation.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Open space. A relatively undeveloped green or wooded area provided mainly within an urban area to minimize feelings of congested living.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash, glacial. Stratified sand and gravel produced by glaciers and carried, sorted, and deposited by glacial melt water.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.20 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, differences in slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity (soil). The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called groundwater runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Salty water (in tables.) Water that is too salty for consumption by livestock.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel;

sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 mm in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	Less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it can soak into the soil or flow slowly to a prepared outlet without harm. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or " very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Till plain. An extensive flat to undulating area underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the low lands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial melt water. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by melt water streams, in a glacial lake or other body of still water in front of a glacier.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

TABLES

TABLE 1.--TEMPERATURE AND PRECIPITATION

Month	Temperature[1]						Precipitation[1]				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[2]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	27.7	11.0	19.4	52	-19	7	1.46	.57	2.18	4	8.0
February---	32.6	15.9	24.3	54	-12	12	1.16	.44	1.73	3	5.8
March------	42.7	25.2	34.0	75	1	63	2.58	1.48	3.47	6	7.7
April------	58.6	37.6	48.1	84	19	254	4.51	2.92	5.94	8	1.1
May--------	69.9	47.3	58.6	91	31	577	3.93	2.55	5.17	8	.0
June-------	80.3	57.9	69.1	96	42	873	4.63	2.59	6.28	7	.0
July-------	83.6	62.3	73.0	96	48	1,023	4.53	2.54	6.15	6	.0
August-----	82.0	60.5	71.3	96	46	970	3.55	1.72	5.03	6	.0
September--	74.6	52.3	63.4	93	34	02	3.92	1.37	5.96	6	.0
October----	63.7	41.8	52.8	86	23	408	3.27	.83	5.21	5	.1
November---	46.4	29.1	37.8	72	7	72	2.35	1.33	3.17	5	2.5
December---	33.0	17.5	25.3	61	-15	16	1.89	.90	2.68	5	8.0
Year-----	57.9	38.2	48.1	98	-19	4,977	37.78	30.24	44.65	69	33.2

[1]Recorded in the period 1951-74 at Rockford, Illinois.

[2]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

Probability	Temperature[1] 24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 22	April 26	May 12
2 years in 10 later than--	April 17	April 22	May 7
5 years in 10 later than--	April 7	April 14	April 28
First freezing temperature in fall:			
1 year in 10 earlier than--	October 20	October 11	September 28
2 years in 10 earlier than--	October 25	October 15	October 3
5 years in 10 earlier than--	November 4	October 23	October 13

[1]Recorded in the period 1951-74 at Rockford, Illinois.

TABLE 3.--GROWING SEASON

Probability	Daily minimum temperature during growing season[1] Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	187	174	146
8 years in 10	195	180	153
5 years in 10	210	192	168
2 years in 10	225	203	182
1 year in 10	233	209	189

[1]Recorded in the period 1951-74 at Rockford, Illinois.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Winnebago County	Boone County	Total--	
				Area	Extent
		Acres	Acres	Acres	Pct
21B	Pecatonica silt loam, 2 to 5 percent slopes	804	8,059	8,863	1.7
21C2	Pecatonica silt loam, 5 to 9 percent slopes, eroded	1,775	4,760	6,535	1.3
22B	Westville silt loam, 2 to 5 percent slopes	711	46	757	0.1
22C2	Westville silt loam, 5 to 9 percent slopes, eroded	541	569	1,110	0.2
22D2	Westville silt loam, 9 to 15 percent slopes, eroded	613	381	994	0.2
27B	Miami silt loam, 1 to 5 percent slopes	529	4,712	5,241	1.0
27C2	Miami silt loam, 5 to 9 percent slopes, eroded	753	1,345	2,098	0.4
36A	Tama silt loam, 0 to 2 percent slopes	1,850	95	1,945	0.4
36B	Tama silt loam, 2 to 5 percent slopes	14,216	102	14,318	2.8
36C2	Tama silt loam, 5 to 9 percent slopes, eroded	1,611	0	1,611	0.3
41	Muscatine silt loam	4,595	736	5,331	1.0
59	Lisbon silt loam	1	3,646	3,647	0.7
61	Atterberry silt loam	4,518	2,710	7,228	1.4
62	Herbert silt loam	24	1,874	1,898	0.4
68	Sable silty clay loam	4,305	8,833	13,138	2.6
82	Millington silt loam	2,103	954	3,057	0.6
93E2	Rodman gravelly loam, 12 to 30 percent slopes, eroded	244	197	441	0.1
100	Palms muck	504	617	1,121	0.2
102	La Hogue silt loam	5,265	2,390	7,655	1.5
103	Houghton muck	481	610	1,091	0.2
104	Virgil silt loam	1,529	3,160	4,689	0.9
107	Sawmill silty clay loam	3,241	90	3,331	0.6
119B	Elco silt loam, 2 to 6 percent slopes	327	161	488	0.1
123	Riverwash	1,888	822	2,710	0.5
125	Selma loam	7,887	5,389	13,276	2.6
145B	Saybrook silt loam, 2 to 5 percent slopes	14	3,785	3,799	0.7
145C2	Saybrook silt loam, 5 to 9 percent slopes, eroded	11	208	219	*
146	Elliott silt loam	633	141	774	0.2
152	Drummer silty clay loam	3,781	16,218	19,999	3.9
172	Hoopeston sandy loam	1,052	181	1,233	0.2
188	Beardstown loam	2,964	1,271	4,235	0.8
197	Troxel silt loam	3,047	546	3,593	0.7
198	Elburn silt loam	1,973	3,807	5,780	1.1
199A	Plano silt loam, 0 to 2 percent slopes	2,362	1,413	3,775	0.7
199B	Plano silt loam, 2 to 5 percent slopes	7,340	2,425	9,765	1.9
199C2	Plano silt loam, 5 to 9 percent slopes, eroded	867	70	937	0.2
221B	Parr silt loam, 2 to 5 percent slopes	151	8,376	8,527	1.7
221C2	Parr silt loam, 5 to 9 percent slopes, eroded	416	1,353	1,769	0.3
223B	Varna silt loam, 2 to 6 percent slopes	1,760	947	2,707	0.5
227B	Argyle silt loam, 2 to 6 percent slopes	1,831	512	2,343	0.5
242	Kendall silt loam	2,220	7,414	9,634	1.9
243A	St. Charles silt loam, 0 to 2 percent slopes	1,118	3,043	4,161	0.8
243B	St. Charles silt loam, 2 to 5 percent slopes	2,427	4,552	6,979	1.4
243C2	St. Charles silt loam, 5 to 9 percent slopes, eroded	1,405	248	1,653	0.3
259B2	Assumption silt loam, 2 to 6 percent slopes, eroded	1,156	7	1,163	0.2
278	Stronghurst silt loam	1,934	3,153	5,087	1.0
279A	Rozetta silt loam, 0 to 3 percent slopes	2,062	3,997	6,059	1.2
280B	Fayette silt loam, 2 to 5 percent slopes	3,274	1,112	4,386	0.9
280C2	Fayette silt loam, 5 to 9 percent slopes, eroded	3,505	48	3,553	0.7
290A	Warsaw loam, 0 to 2 percent slopes	4,637	1,049	5,686	1.1
290B	Warsaw loam, 2 to 5 percent slopes	1,076	283	1,359	0.3
290C2	Warsaw loam, 5 to 9 percent slopes, eroded	233	368	601	0.1
293	Andres silt loam	1,120	58	1,178	0.2
297B	Ringwood silt loam, 2 to 5 percent slopes	238	303	541	0.1
297C2	Ringwood silt loam, 5 to 9 percent slopes, eroded	1,296	608	1,904	0.4
310B	McHenry silt loam, 2 to 5 percent slopes	279	1,130	1,409	0.3
310C2	McHenry silt loam, 5 to 9 percent slopes, eroded	1,459	1,244	2,703	0.5
327B	Fox loam, 1 to 5 percent slopes	84	84	168	*
327C2	Fox loam, 5 to 9 percent slopes, eroded	89	286	375	0.1
329	Will loam	562	1,160	1,722	0.3
332A	Billett sandy loam, 0 to 2 percent slopes	464	145	609	0.1
332B	Billett sandy loam, 2 to 6 percent slopes	2,204	265	2,469	0.5
343	Kane silt loam	495	559	1,054	0.2
354A	Hononegah loamy coarse sand, 0 to 3 percent slopes	2,965	559	3,524	0.7
354B	Hononegah loamy coarse sand, 3 to 7 percent slopes	4,197	200	4,397	0.9
361B	Kidder loam, 2 to 5 percent slopes	238	413	651	0.1
361C2	Kidder loam, 5 to 9 percent slopes, eroded	1,543	1,998	3,541	0.7
361D2	Kidder loam, 9 to 15 percent slopes, eroded	2,861	2,005	4,866	0.9
361D3	Kidder clay loam, 9 to 15 percent slopes, severely eroded	614	261	875	0.2

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Winnebago County	Boone County	Total-- Area	Extent
		Acres	Acres	Acres	Pct
363B	Griswold sandy loam, 2 to 5 percent slopes	4,230	8	4,238	0.8
363C2	Griswold sandy loam, 5 to 9 percent slopes, eroded	10,903	261	11,164	2.2
363D2	Griswold sandy loam, 9 to 15 percent slopes, eroded	6,411	268	6,679	1.3
369	Waupecan silt loam	566	5,194	5,760	1.1
379A	Dakota silt loam, 0 to 3 percent slopes	250	3,755	4,005	0.8
386A	Downs silt loam, 0 to 2 percent slopes	1,196	385	1,581	0.3
386B	Downs silt loam, 2 to 6 percent slopes	8,558	320	8,878	1.7
387A	Ockley silt loam, 0 to 2 percent slopes	50	829	879	0.2
387B	Ockley silt loam, 2 to 5 percent slopes	46	273	319	0.1
398A	Wea silt loam, 0 to 2 percent slopes	1,701	971	2,672	0.5
398B	Wea silt loam, 2 to 5 percent slopes	103	128	231	*
411B	Ashdale silt loam, 2 to 5 percent slopes	1,463	23	1,486	0.3
411C2	Ashdale silt loam, 5 to 9 percent slopes, eroded	964	0	964	0.2
412B	Ogle silt loam, 2 to 5 percent slopes	11,896	1,831	13,727	2.7
415	Orion silt loam	2,187	1,813	4,000	0.8
419A	Flagg silt loam, 0 to 2 percent slopes	249	1,966	2,215	0.4
419B	Flagg silt loam, 2 to 5 percent slopes	3,187	8,230	11,417	2.2
419C2	Flagg silt loam, 5 to 9 percent slopes, eroded	1,739	621	2,360	0.5
429B	Palsgrove silt loam, 2 to 5 percent slopes	1,538	9	1,547	0.3
429C2	Palsgrove silt loam, 5 to 9 percent slopes, eroded	2,330	3	2,333	0.5
440A	Jasper silt loam, 0 to 2 percent slopes	3,778	1,417	5,195	1.0
440B	Jasper silt loam, 2 to 5 percent slopes	7,187	2,647	9,834	1.9
440C2	Jasper silt loam, 5 to 9 percent slopes, eroded	975	344	1,319	0.3
451	Lawson silt loam	3,806	0	3,806	0.7
490	Odell silt loam	393	4,110	4,503	0.9
504C	Sogn silt loam, 4 to 12 percent slopes	3,783	33	3,816	0.7
504E	Sogn silt loam, 12 to 30 percent slopes	1,280	25	1,305	0.3
505C2	Dunbarton silt loam, 4 to 7 percent slopes, eroded	734	1	735	0.1
505D2	Dunbarton silt loam, 7 to 12 percent slopes, eroded	1,418	5	1,423	0.3
505E2	Dunbarton silt loam, 12 to 20 percent slopes, eroded	307	8	315	0.1
506A	Hitt silt loam, 0 to 2 percent slopes	182	8	190	*
506B	Hitt silt loam, 2 to 5 percent slopes	1,303	65	1,368	0.3
506C2	Hitt silt loam, 5 to 9 percent slopes, eroded	676	9	685	0.1
533	Urban land	2,488	280	2,768	0.5
561B	Whalan and NewGlarus silt loams, 2 to 5 percent slopes	494	17	511	0.1
561C2	Whalan and NewGlarus silt loams, 5 to 9 percent slopes, eroded	2,922	70	2,992	0.6
561D2	Whalan and NewGlarus silt loams, 9 to 15 percent slopes, eroded	2,101	62	2,163	0.4
566B	Rockton and Dodgeville soils, 1 to 5 percent slopes	3,376	124	3,500	0.7
566C2	Rockton and Dodgeville soils, 5 to 9 percent slopes, eroded	4,934	123	5,057	1.0
566D2	Rockton and Dodgeville soils, 9 to 15 percent slopes, eroded	862	16	878	0.2
570A	Martinsville silt loam, 0 to 2 percent slopes	1,317	357	1,674	0.3
570B	Martinsville silt loam, 2 to 5 percent slopes	1,515	1,339	2,854	0.6
570C2	Martinsville silt loam, 5 to 9 percent slopes, eroded	1,150	395	1,545	0.3
728B	Winnebago silt loam, 2 to 5 percent slopes	8,174	162	8,336	1.6
728C2	Winnebago silt loam, 5 to 9 percent slopes, eroded	3,410	108	3,518	0.7
728D2	Winnebago silt loam, 9 to 15 percent slopes, eroded	203	0	203	*
768B	Backbone loamy sand, 2 to 5 percent slopes	836	0	836	0.2
768C	Backbone loamy sand, 5 to 9 percent slopes	581	16	597	0.1
768D	Backbone loamy sand, 9 to 15 percent slopes	232	6	238	*
769B	Edmund silt loam, 2 to 5 percent slopes	1,104	21	1,125	0.2
769C	Edmund silt loam, 5 to 9 percent slopes	1,482	4	1,486	0.3
769D2	Edmund silt loam, 9 to 15 percent slopes, eroded	1,431	7	1,438	0.3
771	Hayfield loam	902	592	1,494	0.3
772	Marshan loam	1,609	797	2,406	0.5
776	Comfrey loam	12,753	4,231	16,984	3.3
777	Adrian muck	877	468	1,345	0.3
779B	Chelsea loamy fine sand, 2 to 7 percent slopes	1,316	30	1,346	0.3
779C	Chelsea loamy fine sand, 7 to 12 percent slopes	822	17	839	0.2
780B	Grellton sandy loam, 1 to 5 percent slopes	1,130	144	1,274	0.2
780C2	Grellton sandy loam, 5 to 9 percent slopes, eroded	815	74	889	0.2
781A	Friesland sandy loam, 0 to 2 percent slopes	436	118	554	0.1
781B	Friesland sandy loam, 2 to 6 percent slopes	2,912	111	3,023	0.6
782	Juneau silt loam	445	324	769	0.1
783A	Flagler sandy loam, 0 to 3 percent slopes	4,734	573	5,307	1.0
783B	Flagler sandy loam, 3 to 7 percent slopes	828	58	886	0.2
802	Orthents, loamy	1,573	512	2,085	0.4

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Winnebago County	Boone County	Total-- Area	Total-- Extent
		Acres	Acres	Acres	Pct
864	Pits, quarry, limestone	511	110	621	0.1
865	Pits, gravel	1,330	191	1,521	0.3
939C2	Rodman-Warsaw complex, 4 to 7 percent slopes, eroded	314	253	567	0.1
939D2	Rodman-Warsaw complex, 7 to 12 percent slopes, eroded	467	382	849	0.2
2145B	Urban land-Saybrook complex, 1 to 7 percent slopes	0	977	977	0.2
2354A	Urban land-Hononegah complex, 0 to 3 percent slopes	4,985	0	4,985	1.0
2363B	Urban land-Griswold complex, 1 to 7 percent slopes	5,573	0	5,573	1.1
2363D	Urban land-Griswold complex, 7 to 15 percent slopes	2,614	0	2,614	0.5
2386B	Urban land-Downs complex, 1 to 7 percent slopes	6,200	0	6,200	1.2
2398A	Urban land-Wea complex, 0 to 3 percent slopes	3,873	1,082	4,955	1.0
2566B	Urban land-Rockton complex, 1 to 7 percent slopes	1,051	0	1,051	0.2
2776	Urban land-Comfrey complex	3,648	327	3,975	0.8
2781B	Urban land-Friesland complex, 1 to 7 percent slopes	1,158	0	1,158	0.2
2783A	Urban land-Flagler complex, 0 to 3 percent slopes	4,782	0	4,782	0.9
4776	Comfrey loam, ponded	2,549	127	2,676	0.5
	Unmapped, access not authorized	0	160	160	*
	Water	4,320	732	5,052	1.0
	Total	332,800	181,120	513,920	100.0

* Less than 0.1 percent.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Bromegrass-alfalfa
	Bu	Bu	Bu	Bu	Ton	AUM*
21B------------------------ Pecatonica	118	35	49	65	4.7	7.8
21C2---------------------- Pecatonica	109	32	45	60	4.3	5.8
22B------------------------ Westville	114	35	47	64	4.2	7.0
22C2---------------------- Westville	105	31	43	59	3.9	5.6
22D2---------------------- Westville	99	30	41	56	3.7	5.0
27B------------------------ Miami	121	40	51	68	4.8	8.0
27C2---------------------- Miami	11	37	47	63	4.4	7.0
36A------------------------ Tama	155	46	62	81	5.9	9.8
36B------------------------ Tama	155	46	62	88	5.9	9.8
36C2---------------------- Tama	143	42	57	82	5.4	8.2
41-------------------------- Muscatine	167	51	64	95	6.2	9.2
59-------------------------- Lisbon	155	51	63	92	5.9	9.2
61-------------------------- Atterberry	149	44	60	85	5.6	7.8
62-------------------------- Herbert	140	44	56	81	5.4	8.1
68-------------------------- Sable	156	51	61	85	5.6	8.6
82-------------------------- Millington	133	41	52	68	4.6	7.0
93E2---------------------- Rodman	---	---	---	---	---	---
100------------------------ Palms	115	36	---	---	---	---
102------------------------ La Hogue	129	43	56	80	5.2	7.8
103------------------------ Houghton	129	44	---	---	3.0	---
104------------------------ Virgil	148	45	60	84	5.6	6.0

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Bromegrass-alfalfa
	Bu	Bu	Bu	Bu	Ton	AUM*
107 Sawmill	147	47	54	76	5.5	8.0
119B Elco	112	37	47	64	4.4	7.5
123**. Riverwash	---	---	---	---	---	---
125 Selma	136	44	53	76	5.0	7.5
145B Saybrook	139	46	60	84	5.6	8.4
145C2 Saybrook	128	42	55	77	5.2	8.1
146 Elliott	128	45	55	79	5.1	7.2
152 Drummer	154	51	61	83	5.5	8.6
172 Hoopeston	105	33	47	70	4.1	6.5
188 Beardstown	116	37	52	66	4.5	6.5
197 Troxel	148	45	55	79	5.4	8.1
198 Elburn	161	50	63	94	6.1	9.2
199A Plano	151	45	60	90	5.8	8.5
199B Plano	151	45	60	90	5.8	8.0
199C2 Plano	139	41	55	83	5.3	7.7
221B Parr	129	44	57	78	5.3	8.0
221C2 Parr	119	40	52	72	4.9	7.2
223B Varna	123	41	53	75	4.8	6.8
227B Argyle	124	39	54	72	4.8	8.0
242 Kendall	135	41	55	75	5.2	7.5
243A St. Charles	127	40	56	73	5.1	8.0
243B St. Charles	127	40	56	73	5.1	8.0
243C2 St. Charles	98	37	52	67	4.7	7.0

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Bromegrass-alfalfa
	Bu	Bu	Bu	Bu	Ton	AUM*
259B2 Assumption	124	38	54	75	4.9	8.3
278 Stronghurst	138	42	55	76	5.3	8.7
279A Rozetta	131	40	54	73	5.2	7.0
280B Fayette	129	39	53	73	5.2	7.8
280C2 Fayette	119	36	49	67	4.8	7.5
290A Warsaw	115	40	53	74	4.6	6.6
290B Warsaw	115	40	53	74	4.6	6.6
290C2 Warsaw	106	37	49	68	4.2	5.6
293 Andres	145	48	61	88	5.5	8.0
297B Ringwood	128	44	59	80	5.2	7.7
297C2 Ringwood	118	40	54	74	4.8	7.1
310B McHenry	116	37	52	72	4.6	6.8
310C2 McHenry	107	34	48	66	4.2	6.2
327B Fox	106	33	46	64	4.3	5.8
327C2 Fox	98	30	42	59	4.0	5.0
329 Will	117	43	53	73	4.7	6.5
332A, 332B Billett	90	31	41	58	3.7	5.5
343 Kane	122	43	55	76	4.8	7.2
354A Hononegah	78	25	34	51	3.1	5.0
354B Hononegah	76	24	33	50	3.0	4.5
361B Kidder	101	35	45	67	4.1	---
361C2 Kidder	93	32	41	62	3.8	---
361D2 Kidder	88	30	39	58	3.6	---

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Bromegrass-alfalfa
	Bu	Bu	Bu	Bu	Ton	AUM*
361D3 Kidder	---	---	36	54	3.3	---
363B Griswold	112	41	56	76	4.8	6.1
363C2 Griswold	103	38	52	70	4.4	5.7
363D2 Griswold	97	---	49	66	4.2	5.0
369 Waupecan	149	50	62	81	5.3	8.6
379A Dakota	107	36	51	67	4.5	6.8
386A Downs	148	43	59	83	5.6	7.3
386B Downs	148	43	59	83	5.6	7.2
387A Ockley	126	42	51	75	5.0	8.0
387B Ockley	126	42	51	75	5.0	8.0
398A Wea	144	47	61	80	5.5	8.0
398B Wea	144	47	61	80	5.5	8.0
411B Ashdale	116	39	53	74	5.0	7.1
411C2 Ashdale	107	36	49	68	4.6	6.6
412B Ogle	140	44	58	77	5.3	7.4
415 Orion	135	43	52	72	4.7	8.0
419A Flagg	121	39	52	72	4.8	6.6
419B Flagg	112	30	45	80	4.5	6.6
419C2 Flagg	105	33	40	70	4.2	6.0
429B Palsgrove	108	36	47	63	4.5	6.0
429C2 Palsgrove	99	33	43	58	4.1	5.5
440A Jasper	138	42	57	88	5.3	8.3
440B Jasper	138	42	57	88	5.3	8.3

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Bromegrass-alfalfa
	Bu	Bu	Bu	Bu	Ton	AUM*
440C2: Jasper	127	39	52	81	4.9	8.0
451: Lawson	161	48	62	86	5.7	9.0
490: Odell	143	48	61	87	5.6	8.6
504C, 504E: Sogn	---	---	---	---	2.0	2.5
505C2: Dunbarton	65	21	29	55	2.9	4.0
505D2: Dunbarton	63	20	28	50	2.8	3.3
505E2: Dunbarton	---	---	---	45	2.6	2.5
506A: Hitt	108	40	47	65	4.5	6.4
506B: Hitt	108	40	47	65	4.5	6.1
506C2: Hitt	99	37	43	60	4.1	6.0
533**: Urban land						
561B: Whalan	82	32	43	58	3.6	5.5
561C2: Whalan	75	29	40	53	3.3	4.7
561D2: Whalan	---	---	37	50	3.1	4.0
566B: Rockton	85	28	45	75	3.8	6.0
566C2: Rockton	80	26	43	70	3.6	5.4
566D2: Rockton	70	---	40	62	3.4	5.0
570A: Martinsville	121	37	51	66	4.8	8.0
570B: Martinsville	121	37	51	66	4.8	6.8
570C2: Martinsville	111	34	47	61	4.4	6.0
728B: Winnebago	121	40	51	68	4.8	6.7
728C2: Winnebago	100	36	44	64	4.2	5.8
728D2: Winnebago	95	34	42	61	4.0	5.4

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Bromegrass-alfalfa
	Bu	Bu	Bu	Bu	Ton	AUM*
768B----- Backbone	75	28	38	50	3.1	3.7
768C----- Backbone	---	---	36	---	2.9	3.5
768D----- Backbone	---	---	---	---	2.8	2.3
769B, 769C----- Edmund	84	31	41	53	3.6	4.0
769D2----- Edmund	73	27	37	47	3.1	3.3
771----- Hayfield	103	35	41	55	4.7	3.3
772----- Marshan	109	39	41	58	4.4	6.0
776----- Comfrey	140	46	51	66	5.0	7.0
777----- Adrian	98	33	---	---	2.4	---
779B----- Chelsea	65	23	34	45	2.5	---
779C----- Chelsea	61	21	32	43	2.3	---
780B----- Grellton	103	34	46	66	4.4	5.8
780C2----- Grellton	95	31	42	61	4.0	5.3
781A----- Friesland	120	39	49	68	4.8	5.8
781B----- Friesland	120	39	49	68	4.8	5.8
782----- Juneau	137	40	54	79	5.5	8.3
783A----- Flagler	87	31	39	55	3.5	5.0
783B----- Flagler	84	30	38	53	3.4	4.5
802**. Orthents						
864**, 865**. Pits						
939C2----- Rodman	60	20	35	60	---	---
939D2----- Rodman	---	---	---	50	---	---
2145B----- Urban land	---	---	---	---	---	---

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Bromegrass-alfalfa
	Bu	Bu	Bu	Bu	Ton	AUM*
2354A---------------------- Urban land	---	---	---	---	---	---
2363B---------------------- Urban land	---	---	---	---	---	---
2363D---------------------- Urban land	---	---	---	---	---	---
2386B---------------------- Urban land	---	---	---	---	---	---
2398A---------------------- Urban land	---	---	---	---	---	---
2566B---------------------- Urban land	---	---	---	---	---	---
2776----------------------- Urban land	---	---	---	---	---	---
2781B---------------------- Urban land	---	---	---	---	---	---
2783A---------------------- Urban land	---	---	---	---	---	---
4776----------------------- Comfrey	---	---	---	---	---	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.
** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
21B, 21C2 Pecatonica	2o	Slight	Slight	Slight	Slight	White oak Northern red oak Black walnut	80 80 ---	White oak, black walnut, northern red oak, green ash, sugar maple, eastern white pine, red pine.
22B, 22C2, 22D2 Westville	2o	Slight	Slight	Slight	Slight	White oak Northern red oak Black walnut	80 80 ---	White oak, black walnut, northern red oak, green ash, sugar maple, eastern white pine, red pine.
27B, 27C2 Miami	1o	Slight	Slight	Slight	Slight	White oak Yellow-poplar Sweetgum	90 98 76	Eastern white pine, red pine, white ash, black walnut, black locust.
59 Lisbon	---	--------	--------	--------	--------		---	American sycamore, eastern cottonwood, green ash, eastern white pine, red pine.
61 Atterberry	3o	Slight	Slight	Slight	Slight	White oak Northern red oak Green ash	70 70 ---	Eastern white pine, red pine. eastern redcedar.
62 Herbert	2w	Slight	Moderate	Slight	Slight	White oak Northern red oak Black walnut	80 --- ---	White oak, northern red oak, green ash, American sycamore, eastern white pine, sugar maple.
68 Sable	---	--------	--------	--------	--------		---	Pin oak, green ash, European larch, eastern cottonwood.
82 Millington	---	--------	--------	--------	--------		---	Black spruce, pin oak, green ash, European larch.
93E2 Rodman	3s	Moderate	Severe	Severe	Slight	Northern red oak White oak Red pine Eastern white pine	70 70 75 85	Eastern white pine, red pine, jack pine.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Trees to plant
100 Palms	4w	Slight	Severe	Severe	Severe	Red maple	51	
						Silver maple	76	
						White ash	51	
						Quaking aspen	56	
						Northern white-cedar	27	
						Tamarack	45	
						Black ash	---	
102 La Hogue	---	--------	--------	--------	--------		---	American sycamore, eastern cottonwood, green ash, bur oak, eastern white pine.
103 Houghton	4w	Slight	Severe	Severe	Severe	Red maple	51	
						Silver maple	76	
						White ash	51	
						Quaking aspen	56	
						Tamarack	45	
						Green ash	---	
						Northern white-cedar	27	
104 Virgil	2o	Slight	Slight	Slight	Slight	White oak	80	White oak, northern red oak, black walnut, American sycamore, sugar maple, eastern cottonwood, eastern white pine.
						Northern red oak	80	
						Black walnut	---	
107 Sawmill	---	--------	--------	--------	--------		---	Black spruce, green ash, pin oak, European larch.
119B Elco	2o	Slight	Slight	Slight	Slight	White oak	80	White oak, northern red oak, black walnut, green ash, eastern white pine, red pine, black locust.
						Northern red oak	---	
						Black walnut	---	
125 Selma	---	--------	--------	--------	--------		---	Pin oak, green ash, European larch, black spruce.
145B, 145C2 Saybrook	---	--------	--------	--------	--------		---	Black walnut, green ash, red maple, bur oak, eastern white pine, red pine.
146 Elliott	---	--------	--------	--------	--------		---	White oak, northern red oak, green ash, sugar maple, eastern white pine.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
152 Drummer	---	---	---	---	---		---	Eastern cottonwood, American sycamore, red maple, green ash, pin oak, sweetgum.
172 Hoopeston	---	---	---	---	---		---	Eastern cottonwood, pin oak, American sycamore, red maple, green ash, eastern white pine, red pine, jack pine.
188 Beardstown	2o	Slight	Slight	Slight	Slight	White oak Northern red oak Yellow-poplar Black walnut	80 80 90 ---	Eastern cottonwood, American sycamore, white oak, green ash, eastern white pine.
197 Troxel	---	---	---	---	---		---	White oak, black walnut, northern red oak, green ash, eastern white pine, Norway spruce.
198 Elburn	---	---	---	---	---		---	Eastern cottonwood, green ash, yellow-poplar, eastern white pine.
199A, 199B, 199C2 Plano	---	---	---	---	---		---	Black walnut, eastern white pine, red pine, green ash, northern red oak.
221B, 221C2 Parr	---	---	---	---	---		---	Eastern white pine, red pine, white ash, black walnut, black locust.
223B Varna	---	---	---	---	---		---	White oak, black walnut, northern red oak, green ash, sugar maple, eastern white pine.
227B Argyle	2o	Slight	Slight	Slight	Slight	White oak Northern red oak Black walnut	80 --- ---	White oak, northern red oak, black walnut, green ash, eastern white pine, red pine.
242 Kendall	2w	Slight	Moderate	Slight	Slight	White oak Northern red oak Yellow-poplar Black walnut	80 80 90 ---	White oak, northern red oak, green ash, eastern white pine, red pine.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
243A, 243B, 243C2-- St. Charles	1o	Slight	Slight	Slight	Slight	Yellow-poplar------- White oak----------- Northern red oak---- Sweetgum------------ Green ash-----------	95 85 85 --- ---	White oak, black walnut, sugar maple, eastern white pine, red pine.
259B2-------------- Assumption	---	--------	--------	--------	--------		---	Black walnut, American sycamore, green ash, yellow-poplar, common hackberry, eastern white pine.
278---------------- Stronghurst	3o	Slight	Slight	Slight	Slight	White oak----------- Northern red oak---- Green ash----------- Bur oak-------------	70 70 --- ---	Eastern white pine, red pine, eastern redcedar.
279A--------------- Rozetta	2o	Slight	Slight	Slight	Slight	White oak----------- Northern red oak---- Yellow-poplar------- Black walnut--------	80 80 90 ---	Eastern white pine, northern red oak, green ash, black walnut.
280B, 280C2-------- Fayette	2o	Slight	Slight	Slight	Slight	White oak----------- Northern red oak----	65 65	Eastern white pine, red pine, Norway spruce, white spruce, European larch, black walnut, sugar maple.
290A, 290B, 290C2-- Warsaw	---	--------	--------	--------	--------		---	Eastern white pine, Norway spruce, red pine, white ash.
293---------------- Andres	---	--------	--------	--------	--------		---	White oak, northern red oak, green ash, sugar maple, red pine.
297B, 297C2-------- Ringwood	---	--------	--------	--------	--------		---	Black walnut, green ash, eastern white pine, red pine.
310B, 310C2-------- McHenry	3o	Slight	Slight	Slight	Slight	White oak----------- Northern red oak---- Green ash----------- Bur oak-------------	70 70 --- ---	White oak, northern red oak, green ash, bur oak, eastern white pine, red pine, eastern redcedar.
327B, 327C2-------- Fox	2o	Slight	Slight	Slight	Slight	Northern red oak---- White oak----------- Sugar maple---------	80 --- ---	White ash, eastern white pine, red pine, black locust.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
329----------------- Will	---	--------	--------	--------	--------		---	Black spruce, green ash, European larch, pin oak.
332A, 332B--------- Billett	3o	Slight	Slight	Slight	Slight	Black oak----------- White oak----------- Scarlet oak---------	70 70 70	Eastern white pine, eastern redcedar, red pine.
343----------------- Kane	---	--------	--------	--------	--------		---	American sycamore, eastern cottonwood, green ash, eastern white pine, bur oak, common hackberry.
354A, 354B--------- Hononegah	---	--------	--------	--------	--------		---	Green ash, eastern white pine, red pine, American sycamore, common hackberry, bur oak.
361B, 361C2-------- Kidder	2o	Slight	Slight	Slight	Slight	Northern red oak---- White ash-----------	65 ---	Eastern white pine, red pine, white spruce.
363B, 363C2, 363D2- Griswold	---	--------	--------	--------	--------		---	Eastern white pine, red pine, green ash, northern red oak.
386A, 386B--------- Downs	2o	Slight	Slight	Slight	Slight	White oak----------- Northern red oak----	65 65	Eastern white pine, red pine, Norway spruce, white spruce, European larch, black walnut, sugar maple.
387A, 387B--------- Ockley	1o	Slight	Slight	Slight	Slight	White oak----------- Northern red oak---- Yellow-poplar------- Sweetgum------------	90 90 98 76	Eastern white pine, red pine, white ash, black walnut, black locust.
398A, 398B--------- Wea	---	--------	--------	--------	--------		---	Eastern white pine, red pine, black walnut, black locust, white ash.
411B, 411C2-------- Ashdale	---	--------	--------	--------	--------		---	Black walnut, green ash, eastern white pine, red pine.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
412B Ogle	---	--------	--------	--------	--------		---	Black walnut, American sycamore, green ash, bur oak, eastern white pine, red pine.
415 Orion	3w	Slight	Moderate	Slight	Slight	Silver maple Eastern cottonwood White ash	80 --- ---	White spruce, silver maple, white ash.
419A, 419B, 419C2 Flagg	2o	Slight	Slight	Slight	Slight	White oak Northern red oak Black walnut	80 80 ---	White oak, northern red oak, black walnut, green ash, eastern white pine, red pine, sugar maple.
429B, 429C2 Palsgrove	3o	Slight	Slight	Slight	Slight	White oak Northern red oak Green ash Bur oak	70 70 --- ---	Eastern white pine, eastern redcedar, red pine, black walnut.
440A, 440B, 440C2 Jasper	---	--------	--------	--------	--------		---	Eastern white pine, red pine, white ash, black walnut, black locust.
451 Lawson	4o	Slight	Slight	Slight	Slight	Silver maple White ash American elm	70 --- ---	White spruce, silver maple, white ash.
490 Odell	---	--------	--------	--------	--------		---	Eastern white pine, baldcypress, white ash, red maple, American sycamore.
505C2, 505D2 Dunbarton	3d	Slight	Slight	Moderate	Moderate	Northern red oak Black oak White oak Shagbark hickory	55 --- --- ---	Eastern white pine, jack pine, eastern redcedar, red pine.
505E2 Dunbarton	3d	Severe	Moderate	Moderate	Moderate	Northern red oak Black oak White oak Shagbark hickory	55 --- --- ---	Eastern white pine, jack pine, eastern redcedar, red pine.
506A, 506B, 506C2 Hitt	---	--------	--------	--------	--------		---	Black walnut, American sycamore, green ash, bur oak, common hackberry, eastern white pine, red pine.
561B*, 561C2*: Whalan	3o	Slight	Slight	Slight	Slight	Eastern white pine Northern red oak White oak Black walnut	58 66 66 55	Northern red oak, white oak, silver maple, eastern white pine.

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
561B*, 561C2*:								
NewGlarus	2o	Slight	Slight	Slight	Slight	Northern red oak	65	Red pine, eastern white pine.
						Black oak	---	
						White ash	---	
						Black walnut	---	
561D2*:								
Whalan	3r	Moderate	Moderate	Moderate	Slight	Eastern white pine	55	White oak, northern red oak, eastern white pine, American basswood.
						Northern red oak	55	
						American basswood	55	
						Bur oak	52	
NewGlarus.								
570A, 570B, 570C2 Martinsville	1o	Slight	Slight	Slight	Slight	White oak	90	Eastern white pine, red pine, white ash, black walnut, black locust.
						Yellow-poplar	98	
						Sweetgum	76	
728B, 728C2, 728D2 Winnebago	---	--------	--------	--------	--------		---	Black walnut, American sycamore, eastern cottonwood, green ash, bur oak, common hackberry, eastern white pine, red pine.
768B, 768C, 768D Backbone	3o	Slight	Slight	Slight	Slight	Northern red oak	55	Eastern white pine, red pine, Norway spruce, white spruce, European larch, black walnut, sugar maple.
						White oak	55	
769B, 769C, 769D2 Edmund	5d	Slight	Slight	Moderate	Moderate	Northern red oak	55	Eastern white pine, eastern redcedar, jack pine, red pine.
						White oak	---	
						Black oak	---	
						Shagbark hickory	---	
771 Hayfield	2o	Slight	Slight	Slight	Slight	Northern red oak	63	Northern red oak, white oak, silver maple, eastern white pine.
						White oak	63	
						Eastern white pine	58	
777 Adrian	3w	Slight	Severe	Severe	Severe	Red maple	51	
						Silver maple	76	
						White ash	51	
						Quaking aspen	56	
						Tamarack	45	
						Green ash	51	
779B, 779C Chelsea	3s	Slight	Slight	Moderate	Slight	White oak	55	Eastern white pine, European larch, eastern redcedar, red pine, jack pine.

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
780B, 780C2-------- Grellton	2o	Slight	Slight	Slight	Slight	Northern red oak---- White oak----------- Sugar maple--------- White ash----------- Green ash-----------	65 --- --- --- ---	Red pine, eastern white pine, white spruce.
782---------------- Juneau	2o	Slight	Slight	Slight	Slight	Northern red oak---- Sugar maple--------- American basswood---	65 --- ---	Red pine, eastern white pine, white spruce.
939C2*, 939D2*:								
Rodman------------	3s	Slight	Slight	Severe	Slight	Northern red oak---- White oak----------- Red pine------------ Eastern white pine--	70 70 75 85	Eastern white pine, red pine, jack pine.
Warsaw------------	---	--------	--------	--------	--------		---	Eastern white pine, Norway spruce, red pine, black walnut, white ash.
2145B*: Urban land.								
Saybrook----------	---	--------	--------	--------	--------		---	Black walnut, green ash, red maple, bur oak, eastern white pine, red pine.
2354A*: Urban land.								
Hononegah---------	---	--------	--------	--------	--------		---	Green ash, eastern white pine, red pine, American sycamore, common hackberry, bur oak.
2363B*, 2363D*: Urban land.								
Griswold----------	---	--------	--------	--------	--------		---	Eastern white pine, red pine, green ash, northern red oak.
2386B*: Urban land.								
Downs-------------	2o	Slight	Slight	Slight	Slight	White oak----------- Northern red oak----	65 65	Eastern white pine, red pine, Norway spruce, white spruce, European larch, black walnut, sugar maple.
2398A*: Urban land.								

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
2398A*:								
Wea	---	--------	--------	--------	--------		---	Eastern white pine, red pine, black walnut, black locust, white ash.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

[The symbol < means less than; the symbol > means greater than. Absence of an entry indicates that trees generally do not grow to the given height on that soil]

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
21B, 21C2---------- Pecatonica	Redosier dogwood, gray dogwood.	Autumn-olive, Amur honeysuckle, silky dogwood.	Amur maple, eastern redcedar.	Douglas-fir, Norway spruce, eastern white pine.	American sycamore, eastern cottonwood.
22B, 22C2, 22D2--- Westville	Arrowwood, redosier dogwood.	Autumn-olive, Amur honeysuckle, silky dogwood.	Amur maple, eastern redcedar.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.
27B, 27C2---------- Miami	Redosier dogwood, gray dogwood.	Amur honeysuckle, autumn-olive, silky dogwood.	Eastern hemlock, flowering dogwood, eastern redcedar.	Norway spruce, honeylocust.	Eastern white pine, eastern cottonwood.
36A, 36B, 36C2---- Tama	Redosier dogwood, gray dogwood.	Autumn-olive, silky dogwood, Amur honeysuckle.	Eastern redcedar, Amur maple, flowering dogwood.	Norway spruce, Douglas-fir.	Silver maple, eastern cottonwood.
41---------------- Muscatine	Redosier dogwood, gray dogwood.	Autumn-olive, silky dogwood, Amur honeysuckle.	Eastern redcedar, Amur maple.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, silver maple.
59---------------- Lisbon	Gray dogwood, redosier dogwood.	Autumn-olive, silky dogwood, Amur honeysuckle.	Russian-olive, northern white-cedar.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.
61---------------- Atterberry	Gray dogwood, redosier dogwood.	Autumn-olive, silky dogwood, Amur honeysuckle.	Russian-olive, northern white-cedar.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.
62---------------- Herbert	Gray dogwood, redosier dogwood, arrowwood.	Silky dogwood, Amur honeysuckle.	Northern white-cedar, Russian-olive.	Douglas-fir, eastern white pine, Norway spruce.	Eastern cottonwood, American sycamore, red maple.
68---------------- Sable	Gray dogwood, redosier dogwood.	Silky dogwood, Amur honeysuckle, Amur maple.	Northern white-cedar, bald cypress, Russian-olive.	Green ash, Norway spruce.	Pin oak, eastern cottonwood.
82---------------- Millington	Redosier dogwood, gray dogwood.	Silky dogwood, Amur honeysuckle, autumn-olive.	Russian-olive, eastern redcedar.	Norway spruce, eastern white pine, Douglas-fir.	Eastern cottonwood, American sycamore.
93E2-------------- Rodman	Gray dogwood, common snowberry, Indian current coralberry.	Autumn-olive, late lilac, roughleaf dogwood.	Jack pine, eastern redcedar.	Red pine, eastern white pine, Austrian pine.	---
100--------------- Palms	Dwarf purple willow, redosier dogwood, common winterberry.	Amur honeysuckle, silky dogwood.	Tall purple willow, medium purple willow, northern white-cedar.	Quaking aspen	Lombardy poplar, silver maple.
102--------------- La Hogue	Gray dogwood, redosier dogwood.	Autumn-olive, Amur honeysuckle, silky dogwood.	Amur maple, northern white-cedar.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
103 Houghton	Gray dogwood, dwarf purple willow.	Bald cypress, silky dogwood.	Green ash	Black spruce	---
104 Virgil	Redosier dogwood, gray dogwood.	Autumn-olive, silky dogwood, Amur honeysuckle.	Russian-olive, eastern redcedar.	Eastern white pine, Norway spruce, Douglas-fir.	Eastern cottonwood, American sycamore.
107 Sawmill	Redosier dogwood, gray dogwood.	Amur maple, silky dogwood, Amur honeysuckle.	Northern white-cedar, Russian-olive, bald cypress.	Green ash, Norway spruce.	Eastern cottonwood, pin oak.
119B Elco	Gray dogwood, redosier dogwood.	Autumn-olive, silky dogwood, Amur honeysuckle.	Eastern redcedar, Russian-olive.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.
123*. Riverwash					
125 Selma	Redosier dogwood, gray dogwood.	Amur maple, silky dogwood, Amur honeysuckle.	Northern white-cedar, Russian-olive, bald cypress.	Norway spruce, green ash.	Eastern cottonwood, pin oak.
145B, 145C2 Saybrook	Gray dogwood, redosier dogwood.	Autumn-olive, silky dogwood, Amur honeysuckle.	Russian-olive, eastern redcedar.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.
146 Elliott	Redosier dogwood, gray dogwood.	Silky dogwood, autumn-olive, Amur honeysuckle.	Russian-olive, eastern redcedar.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.
152 Drummer	Gray dogwood, redosier dogwood.	Silky dogwood, Amur honeysuckle, Amur maple.	Northern white-cedar, Russian-olive, bald cypress.	Norway spruce, green ash.	Eastern cottonwood, pin oak.
172 Hoopeston	Gray dogwood, redosier dogwood.	Amur honeysuckle, autumn-olive, silky dogwood.	Russian-olive, eastern redcedar.	Norway spruce, eastern white pine, Douglas-fir.	Eastern cottonwood, American sycamore.
188 Beardstown	Gray dogwood, redosier dogwood.	Amur honeysuckle, autumn-olive, silky dogwood.	Russian-olive, eastern redcedar.	Norway spruce, eastern white pine, Douglas-fir.	Eastern cottonwood, American sycamore.
197 Troxel	Gray dogwood, redosier dogwood.	Silky dogwood, autumn-olive, Amur honeysuckle.	Russian-olive, eastern redcedar.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.
198 Elburn	Gray dogwood, redosier dogwood.	Autumn-olive, silky dogwood, Amur honeysuckle.	Eastern redcedar, Russian-olive.	Norway spruce, eastern white pine, Douglas-fir.	Eastern cottonwood, American sycamore.
199A, 199B, 199C2 Plano	Gray dogwood, redosier dogwood.	Autumn-olive, Amur honeysuckle, silky dogwood.	Russian-olive, eastern redcedar.	Eastern white pine, Norway spruce, Douglas-fir.	Eastern cottonwood, American sycamore.

See footnote at end of table.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
221B, 221C2------- Parr	Gray dogwood, redosier dogwood.	Silky dogwood, Amur honeysuckle, autumn-olive.	Eastern redcedar, Russian-olive.	Norway spruce, eastern white pine, Douglas-fir.	Eastern cottonwood, American sycamore.
223B-------------- Varna	Gray dogwood, redosier dogwood.	Autumn-olive, Amur honeysuckle, silky dogwood.	Eastern redcedar, Russian-olive.	Eastern white pine, Norway spruce, Douglas-fir.	Eastern cottonwood, American sycamore.
227B-------------- Argyle	Gray dogwood, redosier dogwood.	Autumn-olive, silky dogwood, Amur honeysuckle.	Russian-olive, eastern redcedar.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.
242--------------- Kendall	Redosier dogwood, gray dogwood.	Amur honeysuckle, silky dogwood.	Russian-olive, Amur maple.	Eastern white pine, Douglas-fir, Norway spruce.	Eastern cottonwood, American sycamore, red maple.
243A, 243B, 243C2- St. Charles	Gray dogwood, redosier dogwood.	Autumn-olive, silky dogwood, Amur honeysuckle.	Russian-olive, eastern redcedar.	Norway spruce, eastern white pine, Douglas-fir.	Eastern cottonwood, American sycamore.
259B2------------- Assumption	Gray dogwood, redosier dogwood.	Silky dogwood, autumn-olive, Amur honeysuckle.	Russian-olive, eastern redcedar.	Eastern white pine, Norway spruce, Douglas-fir.	Eastern cottonwood, American sycamore.
278--------------- Stronghurst	Gray dogwood, redosier dogwood.	Autumn-olive, silky dogwood, Amur honeysuckle.	Russian-olive, eastern redcedar.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.
279A-------------- Rozetta	Gray dogwood, redosier dogwood.	Autumn-olive, Amur honeysuckle, silky dogwood.	Russian-olive, eastern redcedar.	Norway spruce, eastern white pine, Douglas-fir.	Eastern cottonwood, American sycamore.
280B, 280C2------- Fayette	Redosier dogwood, gray dogwood.	Autumn-olive, Amur honeysuckle, silky dogwood.	Russian-olive, eastern redcedar.	Douglas-fir, eastern white pine, Norway spruce.	Eastern cottonwood, American sycamore.
290A, 290B, 290C2- Warsaw	Redosier dogwood, gray dogwood.	Silky dogwood, Amur honeysuckle, autumn-olive.	Eastern redcedar, Russian-olive.	Norway spruce, eastern white pine, Douglas-fir.	Eastern cottonwood, American sycamore.
293--------------- Andres	Gray dogwood, redosier dogwood.	Autumn-olive, Amur honeysuckle, silky dogwood.	Russian-olive, eastern redcedar.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.
297B, 297C2------- Ringwood	Gray dogwood, redosier dogwood.	Autumn-olive, Amur honeysuckle, silky dogwood.	Russian-olive, eastern redcedar.	Eastern white pine, Norway spruce, Douglas-fir.	Eastern cottonwood, American sycamore.
310B, 310C2------- McHenry	Gray dogwood, redosier dogwood.	Autumn-olive, Amur honeysuckle, silky dogwood.	Eastern redcedar, Russian-olive.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
327B, 327C2-------Fox	Redosier dogwood, gray dogwood.	Autumn-olive, Amur honeysuckle, silky dogwood.	Russian-olive, eastern redcedar.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.
329---------------Will	Redosier dogwood, gray dogwood.	Silky dogwood, bald cypress.	Green ash---------	Black spruce------	---
332A, 332B--------Billett	Gray dogwood, redosier dogwood.	Autumn-olive, silky dogwood, Amur honeysuckle.	Eastern redcedar, Russian-olive.	Eastern white pine, Norway spruce, Douglas-fir.	Eastern cottonwood, American sycamore.
343---------------Kane	Redosier dogwood, gray dogwood.	Autumn-olive, silky dogwood, Amur honeysuckle.	Russian-olive, eastern redcedar.	Eastern white pine, Norway spruce, Douglas-fir.	Eastern cottonwood, American sycamore.
354A, 354B--------Hononegah	Vanhoutte spirea, gray dogwood.	Eastern redcedar, autumn-olive.	Norway spruce, eastern white pine.	---	---
361B, 361C2, 361D2, 361D3-----Kidder	Redosier dogwood, gray dogwood.	Autumn-olive, Amur honeysuckle, silky dogwood.	Russian-olive, eastern redcedar.	Eastern white pine, Norway spruce, Douglas-fir.	Eastern cottonwood, American sycamore.
363B, 363C2, 363D2------------Griswold	Redosier dogwood, gray dogwood.	Amur honeysuckle, autumn-olive, silky dogwood.	Russian-olive, eastern redcedar.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.
369---------------Waupecan	Redosier dogwood, gray dogwood.	Silky dogwood, autumn-olive, Amur honeysuckle.	Eastern redcedar, Russian-olive.	Eastern white pine, Douglas-fir, Norway spruce.	Eastern cottonwood, American sycamore.
379A--------------Dakota	Redosier dogwood, gray dogwood.	Autumn-olive, silky dogwood, Amur honeysuckle.	Eastern redcedar, Russian-olive.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.
386A, 386B--------Downs	Redosier dogwood, gray dogwood.	Autumn-olive, silky dogwood, Amur honeysuckle.	Eastern redcedar, Russian-olive.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.
387A, 387B--------Ockley	Redosier dogwood, gray dogwood.	Autumn-olive, silky dogwood, Amur honeysuckle.	Russian-olive, eastern redcedar.	Eastern white pine, Norway spruce, Douglas-fir.	Eastern cottonwood, American sycamore.
398A, 398B--------Wea	Redosier dogwood, gray dogwood.	Silky dogwood, Amur honeysuckle, autumn-olive.	Russian-olive, eastern redcedar.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
411B, 411C2------- Ashdale	Gray dogwood, redosier dogwood.	Autumn-olive, Amur honeysuckle, silky dogwood.	Russian-olive, eastern redcedar.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.
412B-------------- Ogle	Redosier dogwood, gray dogwood.	Autumn-olive, silky dogwood, Amur honeysuckle.	Eastern redcedar, Russian-olive.	Eastern white pine, Douglas-fir, Norway spruce.	Eastern cottonwood, American sycamore.
415--------------- Orion	Redosier dogwood, gray dogwood.	Amur maple, silky dogwood.	Northern white-cedar, green ash, bald cypress.	Red maple, pin oak.	---
419A, 419B, 419C2- Flagg	Redosier dogwood, gray dogwood.	Autumn-olive, Amur honeysuckle, silky dogwood.	Russian-olive, eastern redcedar.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.
429B, 429C2------- Palsgrove	Gray dogwood, redosier dogwood.	Autumn-olive, Amur honeysuckle, silky dogwood.	Eastern redcedar, Russian-olive.	Norway spruce, eastern white pine, Douglas-fir.	Eastern cottonwood, American sycamore.
440A, 440B, 440C2- Jasper	Redosier dogwood, gray dogwood.	Silky dogwood, Amur honeysuckle, autumn-olive.	Eastern redcedar, Russian-olive.	Norway spruce, eastern white pine, Douglas-fir.	Eastern cottonwood, American sycamore.
451--------------- Lawson	Redosier dogwood, gray dogwood.	Amur maple, silky dogwood.	Green ash, bald cypress, northern white-cedar.	Pin oak, red maple.	---
490--------------- Odell	Redosier dogwood, gray dogwood.	Amur maple, silky dogwood.	Green ash, bald cypress, northern white-cedar.	Pin oak, red maple.	---
504C, 504E-------- Sogn	Redosier dogwood, gray dogwood, Vanhoutte spirea.	Silky dogwood, autumn-olive.	Eastern redcedar, jack pine.	---	---
505C2, 505D2, 505E2------------ Dunbarton	Redosier dogwood, gray dogwood, Vanhoutte spirea.	Silky dogwood, autumn-olive.	Eastern redcedar, jack pine.	---	---
506A, 506B, 506C2- Hitt	Gray dogwood, redosier dogwood.	Autumn-olive, Amur honeysuckle, silky dogwood.	Russian-olive, eastern redcedar.	Eastern white pine, Norway spruce, Douglas-fir.	Eastern cottonwood, American sycamore.
533*. Urban land					
561B*, 561C2*:					
Whalan-----------	Redosier dogwood, gray dogwood.	Autumn-olive, silky dogwood, Amur honeysuckle.	Eastern redcedar, Russian-olive.	Eastern white pine, Norway spruce. Douglas-fir.	Eastern cottonwood, American sycamore.
NewGlarus--------	Redosier dogwood, gray dogwood.	Autumn-olive, silky dogwood, Amur honeysuckle.	Russian-olive, eastern redcedar.	Eastern white pine, Norway spruce, Douglas-fir.	Eastern cottonwood, American sycamore.
561D2*:					
Whalan-----------	Redosier dogwood, gray dogwood.	Amur honeysuckle, autumn-olive, silky dogwood.	Russian-olive, eastern redcedar.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.

See footnote at end of table.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
561D2*:					
NewGlarus	Redosier dogwood, gray dogwood.	Amur honeysuckle, silky dogwood, autumn-olive.	Russian-olive, eastern redcedar.	Eastern white pine, Norway spruce, Douglas-fir.	Eastern cottonwood, American sycamore.
566B*, 566C2*:					
Rockton	Redosier dogwood, gray dogwood.	Autumn-olive, silky dogwood, Amur honeysuckle.	Eastern redcedar, Russian-olive.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.
Dodgeville	Redosier dogwood, gray dogwood.	Amur honeysuckle, autumn-olive, silky dogwood.	Russian-olive, eastern redcedar.	Eastern white pine, Norway spruce, Douglas-fir.	Eastern cottonwood, American sycamore.
566D2*:					
Rockton.					
Dodgeville	Redosier dogwood, gray dogwood.	Amur honeysuckle, autumn-olive, silky dogwood.	Russian-olive, eastern redcedar.	Eastern white pine, Norway spruce, Douglas-fir.	Eastern cottonwood, American sycamore.
570A, 570B, 570C2 Martinsville	Redosier dogwood, gray dogwood.	Silky dogwood, Amur honeysuckle, autumn-olive.	Eastern redcedar, Russian-olive.	Norway spruce, eastern white pine, Douglas-fir.	Eastern cottonwood, American sycamore.
728B, 728C2, 728D2 Winnebago	Redosier dogwood, gray dogwood.	Autumn-olive, Amur honeysuckle, silky dogwood.	Russian-olive, eastern redcedar.	Eastern white pine, Norway spruce, Douglas-fir.	Eastern cottonwood, American sycamore.
768B, 768C, 768D Backbone	Redosier dogwood, gray dogwood.	Autumn-olive, silky dogwood.	Russian-olive, eastern redcedar.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.
769B, 769C, 769D2 Edmund	Redosier dogwood, gray dogwood, Vanhoutte spirea.	Silky dogwood, autumn-olive.	Eastern redcedar, jack pine.	---	---
771 Hayfield	Redosier dogwood, gray dogwood.	Silky dogwood, Amur honeysuckle, autumn-olive.	Eastern redcedar, Russian-olive.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.
772 Marshan	Redosier dogwood, gray dogwood.	Silky dogwood, Amur honeysuckle, forsythia.	Amur maple, bald cypress.	Pin oak, green ash.	Eastern cottonwood, American sycamore, red maple.
776. Comfrey					
777 Adrian	Redosier dogwood, gray dogwood.	Silky dogwood, Amur maple.	Northern white-cedar, bald cypress, green ash.	Pin oak, red maple.	---

See footnote at end of table.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
779B, 779C: Chelsea	Vanhoutte spirea, gray dogwood.	Eastern redcedar, autumn-olive.	Norway spruce, eastern white pine.	---	---
780B, 780C2: Grellton	Redosier dogwood, gray dogwood.	Amur honeysuckle, autumn-olive, silky dogwood.	Russian-olive, eastern redcedar.	Eastern white pine, Norway spruce, Douglas-fir.	Eastern cottonwood, American sycamore.
781A, 781B: Friesland	Redosier dogwood, gray dogwood.	Amur honeysuckle, autumn-olive, silky dogwood.	Russian-olive, eastern redcedar.	Eastern white pine, Norway spruce, Douglas-fir.	Eastern cottonwood, American sycamore.
782: Juneau	Redosier dogwood, gray dogwood.	Amur honeysuckle, autumn-olive, silky dogwood.	Russian-olive, eastern redcedar.	Eastern white pine, Norway spruce, Douglas-fir.	Eastern cottonwood, American sycamore.
783A, 783B: Flagler	Redosier dogwood, gray dogwood.	Autumn-olive, Amur honeysuckle, silky dogwood.	Eastern redcedar, Russian-olive.	Norway spruce, eastern white pine, Douglas-fir.	Eastern cottonwood, American sycamore.
802*. Orthents					
864*, 865*. Pits					
939C2*, 939D2*:					
Rodman	Vanhoutte spirea, gray dogwood.	Autumn-olive, eastern redcedar.	Norway spruce, eastern white pine.	---	---
Warsaw	Redosier dogwood, gray dogwood.	Silky dogwood, Amur honeysuckle, autumn-olive.	Eastern redcedar, Russian-olive.	Norway spruce, eastern white pine, Douglas-fir.	Eastern cottonwood, American sycamore.
2145B*: Urban land.					
Saybrook	Gray dogwood, redosier dogwood.	Autumn-olive, silky dogwood, Amur honeysuckle.	Russian-olive, eastern redcedar.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.
2354A*: Urban land.					
Hononegah	Vanhoutte spirea, gray dogwood.	Eastern redcedar, autumn-olive.	Norway spruce, eastern white pine.	---	---
2363B*, 2363D*: Urban land.					
Griswold	Redosier dogwood, gray dogwood.	Amur honeysuckle, autumn-olive, silky dogwood.	Russian-olive, eastern redcedar.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.

See footnote at end of table.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
2386B*: Urban land.					
Downs	Redosier dogwood, gray dogwood.	Autumn-olive, silky dogwood, Amur honeysuckle.	Eastern redcedar, Russian-olive.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.
2398A*: Urban land.					
Wea	Redosier dogwood, gray dogwood.	Silky dogwood, Amur honeysuckle, autumn-olive.	Eastern redcedar, Russian-olive.	Norway spruce, eastern white pine, Douglas-fir.	Eastern cottonwood, American sycamore.
2566B*: Urban land.					
Rockton	Redosier dogwood, gray dogwood.	Autumn-olive, silky dogwood, Amur honeysuckle.	Eastern redcedar, Russian-olive.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.
2776*: Urban land.					
Comfrey.					
2781B*: Urban land.					
Friesland	Redosier dogwood, gray dogwood.	Amur honeysuckle, autumn-olive, silky dogwood.	Russian-olive, eastern redcedar.	Eastern white pine, Norway spruce, Douglas-fir.	Eastern cottonwood, American sycamore.
2783A*: Urban land.					
Flagler	Redosier dogwood, gray dogwood.	Autumn-olive, Amur honeysuckle, silky dogwood.	Eastern redcedar, Russian-olive.	Norway spruce, Douglas-fir, eastern white pine.	Eastern cottonwood, American sycamore.
4776. Comfrey					

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
21B: Pecatonica	Slight	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Severe: low strength.
21C2: Pecatonica	Slight	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: slope, shrink-swell, low strength.	Severe: low strength.
22B: Westville	Slight	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Severe: low strength.
22C2: Westville	Slight	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: slope, shrink-swell, low strength.	Severe: low strength.
22D2: Westville	Moderate: slope.	Moderate: shrink-swell, slope, low strength.	Moderate: shrink-swell, slope, low strength.	Severe: slope.	Severe: low strength.
27B: Miami	Slight	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Severe: low strength.
27C2: Miami	Slight	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: slope, shrink-swell, low strength.	Severe: low strength.
36A, 36B: Tama	Slight	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: shrink-swell, low strength.	Severe: frost action, low strength.
36C2: Tama	Slight	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: slope, shrink-swell, low strength.	Severe: frost action, low strength.
41: Muscatine	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.
59: Lisbon	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength.
61: Atterberry	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: frost action, low strength.
62: Herbert	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength.
68: Sable	Severe: wetness, floods.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
82: Millington	Severe: wetness, floods.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness, low strength.
93E2: Rodman	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
100: Palms	Severe: wetness, excess humus, floods.	Severe: wetness, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.
102: La Hogue	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength.
103: Houghton	Severe: wetness, floods, excess humus.	Severe: wetness, floods, low strength.	Severe: wetness, low strength, floods.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.
104: Virgil	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength.
107: Sawmill	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods, low strength.
119B: Elco	Moderate: wetness.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, wetness.	Moderate: slope, shrink-swell, low strength.	Severe: frost action, low strength.
123*. Riverwash					
125: Selma	Severe: wetness, floods.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: wetness, frost action, floods.
145B: Saybrook	Moderate: wetness.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Severe: frost action, low strength.
145C2: Saybrook	Moderate: wetness.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: slope, shrink-swell, low strength.	Severe: frost action, low strength.
146: Elliott	Severe: wetness.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: frost action, low strength.
152: Drummer	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods, low strength.
172: Hoopeston	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.

See footnote at end of table.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
188 Beardstown	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.
197 Troxel	Severe: floods, cutbanks cave.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: frost action, low strength.
198 Elburn	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength.
199A, 199B Plano	Slight	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Severe: frost action, low strength.
199C2 Plano	Slight	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, slope, low strength.	Severe: frost action, low strength.
221B Parr	Slight	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Severe: low strength.
221C2 Parr	Slight	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: slope, shrink-swell, low strength.	Severe: low strength.
223B Varna	Slight	Moderate: shrink-swell, low strength.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, low strength, slope.	Severe: low strength, frost action.
227B Argyle	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, frost action.
242 Kendall	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength.
243A, 243B St. Charles	Slight	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Severe: frost action, low strength.
243C2 St. Charles	Slight	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: slope, shrink-swell, low strength.	Severe: frost action, low strength.
259B2 Assumption	Slight	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, wetness.	Moderate: slope, shrink-swell, low strength.	Severe: frost action, low strength.
278 Stronghurst	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength.
279A Rozetta	Moderate: wetness.	Moderate: shrink-swell, low strength.	Moderate: wetness, shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Severe: frost action, low strength.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
280B-------------- Fayette	Slight-----------	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: shrink-swell, low strength.	Severe: frost action, low strength.
280C2------------- Fayette	Slight-----------	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: slope, shrink-swell, low strength.	Severe: frost action, low strength.
290A, 290B-------- Warsaw	Severe: cutbanks cave.	Moderate: low strength.	Moderate: low strength.	Moderate: low strength.	Severe: low strength.
290C2------------- Warsaw	Severe: cutbanks cave.	Moderate: low strength.	Moderate: low strength.	Moderate: slope, low strength.	Severe: low strength.
293--------------- Andres	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength.
297B-------------- Ringwood	Slight-----------	Moderate: low strength.	Moderate: low strength.	Moderate: low strength.	Severe: low strength.
297C2------------- Ringwood	Slight-----------	Moderate: low strength.	Moderate: low strength.	Moderate: slope, low strength.	Severe: low strength.
310B-------------- McHenry	Slight-----------	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Severe: low strength.
310C2------------- McHenry	Slight-----------	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: slope, shrink-swell, low strength.	Severe: low strength.
327B-------------- Fox	Severe: cutbanks cave.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Severe: low strength.
327C2------------- Fox	Severe: cutbanks cave.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: slope, shrink-swell, low strength.	Severe: low strength.
329--------------- Will	Severe: wetness, floods, cutbanks cave.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, frost action, low strength.
332A-------------- Billett	Severe: cutbanks cave.	Slight-----------	Slight-----------	Slight------------	Moderate: frost action.
332B-------------- Billett	Severe: cutbanks cave.	Slight-----------	Slight-----------	Moderate: slope.	Moderate: frost action.
343--------------- Kane	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.
354A-------------- Hononegah	Severe: cutbanks cave.	Slight-----------	Slight-----------	Slight------------	Slight.
354B-------------- Hononegah	Severe: cutbanks cave.	Slight-----------	Slight-----------	Moderate: slope.	Slight.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
361B-------------- Kidder	Slight-----------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, frost action.
361C2------------- Kidder	Slight-----------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: low strength, frost action.
361D2, 361D3------ Kidder	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: low strength, slope, frost action.
363B-------------- Griswold	Slight-----------	Slight-----------	Slight-----------	Slight------------	Moderate: frost action.
363C2------------- Griswold	Slight-----------	Slight-----------	Slight-----------	Moderate: slope.	Moderate: frost action.
363D2------------- Griswold	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.
369--------------- Waupecan	Severe: cutbanks cave.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Severe: low strength, frost action.
379A-------------- Dakota	Severe: cutbanks cave.	Slight-----------	Slight-----------	Slight------------	Moderate: low strength.
386A-------------- Downs	Slight-----------	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: shrink-swell, low strength.	Severe: frost action, low strength.
386B-------------- Downs	Slight-----------	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: slope, shrink-swell, low strength.	Severe: frost action, low strength.
387A, 387B-------- Ockley	Severe: cutbanks cave.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Severe: low strength.
398A, 398B-------- Wea	Slight-----------	Moderate: low strength, shrink-swell.	Moderate: shrink-swell, low strength.	Moderate: low strength, shrink-swell.	Severe: low strength.
411B-------------- Ashdale	Moderate: depth to rock.	Moderate: shrink-swell, low strength.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, low strength.	Severe: frost action, low strength.
411C2------------- Ashdale	Moderate: depth to rock.	Moderate: shrink-swell, low strength.	Moderate: depth to rock, shrink-swell.	Moderate: slope, shrink-swell, low strength.	Severe: frost action, low strength.
412B-------------- Ogle	Slight-----------	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Severe: frost action, low strength.
415--------------- Orion	Severe: wetness, floods.	Severe: floods, wetness.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: floods, frost action, low strength.
419A, 419B-------- Flagg	Slight-----------	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Severe: frost action, low strength.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
419C2------------- Flagg	Slight-----------	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: slope, shrink-swell, low strength.	Severe: frost action, low strength.
429B, 429C2------- Palsgrove	Moderate: depth to rock.	Severe: shrink-swell, low strength.	Severe: low strength, shrink-swell.	Severe: shrink-swell, low strength.	Severe: frost action, low strength.
440A, 440B-------- Jasper	Slight-----------	Moderate: low strength.	Moderate: low strength.	Moderate: low strength.	Moderate: frost action.
440C2------------- Jasper	Slight-----------	Moderate: low strength.	Moderate: low strength.	Moderate: slope, low strength.	Moderate: frost action.
451--------------- Lawson	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: frost action, low strength, floods.
490--------------- Odell	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength, wetness.
504C, 504E-------- Sogn	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.
505C2------------- Dunbarton	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell.	Moderate: depth to rock, frost action.
505D2------------- Dunbarton	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: slope, shrink-swell.	Moderate: slope, depth to rock, frost action.
505E2------------- Dunbarton	Severe: slope, depth to rock.	Severe: slope, shrink-swell.	Severe: depth to rock, slope, shrink-swell.	Severe: slope, shrink-swell.	Severe: slope.
506A, 506B-------- Hitt	Moderate: depth to rock.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, depth to rock.	Moderate: shrink-swell, low strength.	Severe: low strength.
506C2------------- Hitt	Moderate: depth to rock.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, depth to rock.	Moderate: slope, shrink-swell, low strength.	Severe: low strength.
533*. Urban land					
561B*:					
Whalan-----------	Moderate: depth to rock.	Slight-----------	Moderate: depth to rock.	Slight-----------	Moderate: low strength, frost action.
NewGlarus--------	Moderate: depth to rock, too clayey.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: low strength, frost action.

See footnote at end of table.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
561C2*:					
Whalan	Moderate: depth to rock.	Slight	Moderate: depth to rock.	Moderate: slope.	Moderate: low strength, frost action.
NewGlarus	Moderate: depth to rock, too clayey.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: low strength, frost action.
561D2*:					
Whalan	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope, low strength, frost action.
NewGlarus	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: slope, shrink-swell, low strength.	Severe: low strength, frost action.
566B*, 566C2*:					
Rockton	Moderate: depth to rock.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: low strength.
Dodgeville	Moderate: depth to rock, too clayey.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: low strength, frost action.
566D2*:					
Rockton	Moderate: depth to rock, slope.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: slope, shrink-swell, low strength.	Severe: low strength.
Dodgeville	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: shrink-swell, slope, low strength.	Severe: low strength, frost action.
570A, 570B Martinsville	Moderate: too clayey.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Severe: low strength.
570C2 Martinsville	Moderate: too clayey.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: slope, shrink-swell, low strength.	Severe: low strength.
728B Winnebago	Slight	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Severe: low strength.
728C2 Winnebago	Slight	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, slope, low strength.	Severe: low strength.
728D2 Winnebago	Moderate: slope.	Moderate: shrink-swell, slope, low strength.	Moderate: shrink-swell, slope, low strength.	Severe: slope.	Severe: low strength.
768B Backbone	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: depth to rock.	Moderate: depth to rock.

See footnote at end of table.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
768C-------------- Backbone	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: depth to rock, slope.	Moderate: depth to rock.
768D-------------- Backbone	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock.
769B, 769C-------- Edmund	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell.	Moderate: depth to rock, frost action.
769D2------------- Edmund	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell, slope.	Moderate: depth to rock, slope, frost action.
771--------------- Hayfield	Severe: cutbanks cave.	Slight-----------	Moderate: wetness.	Slight------------	Severe: frost action.
772--------------- Marshan	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action, low strength.
776--------------- Comfrey	Severe: wetness, floods.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.
777--------------- Adrian	Severe: wetness, cutbanks cave, excess humus.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.
779B-------------- Chelsea	Severe: cutbanks cave.	Slight-----------	Slight-----------	Moderate: slope.	Slight.
779C-------------- Chelsea	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
780B-------------- Grellton	Slight-----------	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Severe: low strength.
780C2------------- Grellton	Slight-----------	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: slope, shrink-swell, low strength.	Severe: low strength.
781A-------------- Friesland	Slight-----------	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: frost action, low strength.
781B-------------- Friesland	Slight-----------	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: slope, shrink-swell, low strength.	Moderate: frost action, low strength.
782--------------- Juneau	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: low strength, floods, frost action.
783A, 783B-------- Flagler	Severe: cutbanks cave.	Slight-----------	Slight-----------	Slight------------	Slight.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
802*. Orthents					
864*, 865*. Pits					
939C2*:					
Rodman	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight.
Warsaw	Severe: cutbanks cave.	Moderate: low strength.	Moderate: low strength.	Moderate: slope, low strength.	Severe: low strength.
939D2*:					
Rodman	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
Warsaw	Severe: cutbanks cave.	Moderate: slope, low strength.	Moderate: slope, low strength.	Severe: slope.	Severe: low strength.
2145B*: Urban land.					
Saybrook	Moderate: wetness.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, wetness.	Moderate: slope, shrink-swell, low strength.	Severe: frost action, low strength.
2354A*: Urban land.					
Hononegah	Severe: cutbanks cave.	Slight	Slight	Slight	Slight.
2363B*: Urban land.					
Griswold	Slight	Slight	Slight	Moderate: slope.	Moderate: frost action.
2363D*: Urban land.					
Griswold	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.
2386B*: Urban land.					
Downs	Slight	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: slope, shrink-swell, low strength.	Severe: frost action, low strength.
2398A*: Urban land.					
Wea	Slight	Moderate: low strength, shrink-swell.	Moderate: shrink-swell, low strength.	Moderate: low strength, shrink-swell.	Severe: low strength.
2566B*: Urban land.					

See footnote at end of table.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
2566B*:					
Rockton----------	Moderate: depth to rock.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: low strength.
2776*:					
Urban land.					
Comfrey----------	Severe: wetness, floods.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.
2781B*:					
Urban land.					
Friesland--------	Slight-----------	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: slope, shrink-swell, low strength.	Moderate: frost action, low strength.
2783A*:					
Urban land.					
Flagler----------	Severe: cutbanks cave.	Slight-----------	Slight-----------	Slight------------	Slight.
4776-------------- Comfrey	Severe: wetness, floods.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," and "fair." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
21B----------------- Pecatonica	Slight-----------	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
21C2---------------- Pecatonica	Slight-----------	Severe: slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
22B----------------- Westville	Slight-----------	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
22C2---------------- Westville	Slight-----------	Severe: slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
22D2---------------- Westville	Moderate: slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: slope, too clayey.
27B----------------- Miami	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
27C2---------------- Miami	Moderate: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
36A----------------- Tama	Slight-----------	Moderate: seepage.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
36B----------------- Tama	Slight-----------	Moderate: slope, seepage.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
36C2---------------- Tama	Slight-----------	Severe: slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
41------------------ Muscatine	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
59------------------ Lisbon	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
61------------------ Atterberry	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
62------------------ Herbert	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey.
68------------------ Sable	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Poor: wetness.
82------------------ Millington	Severe: floods, wetness.	Severe: wetness, seepage.	Severe: wetness, floods, seepage.	Severe: wetness, floods, seepage.	Poor: wetness.
93E2*--------------- Rodman	Severe: slope.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage, slope.	Poor: too sandy, slope, small stones.

See footnote at end of table.

TABLE 9.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
100----------------- Palms	Severe: wetness, floods, subsides.	Severe: wetness, seepage, floods.	Severe: wetness, floods, seepage.	Severe: wetness, floods, seepage.	Poor: wetness, hard to pack.
102*---------------- La Hogue	Severe: wetness.	Severe: wetness, seepage.	Severe: seepage, wetness.	Severe: wetness, seepage.	Poor: wetness.
103----------------- Houghton	Severe: wetness, floods.	Severe: wetness, seepage, floods.	Severe: wetness, floods, seepage.	Severe: wetness, floods, seepage.	Poor: hard to pack, wetness.
104----------------- Virgil	Severe: percs slowly, wetness.	Severe: wetness, seepage.	Severe: seepage, wetness.	Severe: wetness, seepage.	Poor: wetness.
107----------------- Sawmill	Severe: floods, wetness.	Severe: floods, wetness.	Severe: wetness, floods.	Severe: wetness, floods.	Poor: wetness.
119B---------------- Elco	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
123**. Riverwash					
125----------------- Selma	Severe: wetness, floods.	Severe: seepage, wetness.	Severe: wetness, floods, seepage.	Severe: wetness, floods, seepage.	Poor: wetness.
145B---------------- Saybrook	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
145C2--------------- Saybrook	Moderate: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
146----------------- Elliott	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
152----------------- Drummer	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Poor: wetness.
172*---------------- Hoopeston	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: too sandy, wetness, seepage.
188----------------- Beardstown	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness, seepage.	Poor: wetness.
197----------------- Troxel	Severe: floods.	Moderate: seepage.	Severe: floods.	Moderate: floods.	Fair: too clayey.
198----------------- Elburn	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: wetness.

See footnotes at end of table.

TABLE 9.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
199A: Plano	Slight	Moderate: seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
199B: Plano	Slight	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
199C2: Plano	Slight	Severe: slope.	Moderate: too clayey.	Slight	Fair: too clayey.
221B: Parr	Moderate: percs slowly.	Moderate: slope, seepage.	Slight	Slight	Good.
221C2: Parr	Moderate: percs slowly.	Severe: slope.	Slight	Slight	Good.
223B: Varna	Severe: percs slowly, wetness.	Moderate: slope.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey.
227B: Argyle	Slight	Moderate: slope, seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
242: Kendall	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
243A: St. Charles	Slight	Moderate: seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
243B: St. Charles	Slight	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
243C2: St. Charles	Slight	Severe: slope.	Moderate: too clayey.	Slight	Fair: too clayey.
259B2: Assumption	Severe: percs slowly, wetness.	Severe: wetness.	Moderate: too clayey, wetness.	Slight	Fair: too clayey, wetness.
278: Stronghurst	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
279A: Rozetta	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
280B: Fayette	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
280C2: Fayette	Moderate: percs slowly.	Severe: slope, seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
290A*, 290B*: Warsaw	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: small stones.
290C2*: Warsaw	Slight	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: small stones.
293: Andres	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.

See footnotes at end of table.

TABLE 9.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
297B----------------- Ringwood	Slight-----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too clayey.
297C2---------------- Ringwood	Slight-----------	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too clayey.
310B----------------- McHenry	Slight-----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too clayey, small stones.
310C2---------------- McHenry	Slight-----------	Severe: slope, seepage.	Severe: seepage.	Severe: seepage.	Fair: too clayey, small stones.
327B*---------------- Fox	Slight-----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: too sandy, seepage.
327C2*--------------- Fox	Slight-----------	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: too sandy, seepage.
329*----------------- Will	Severe: wetness, floods.	Severe: wetness, seepage.	Severe: wetness, floods, seepage.	Severe: wetness, floods.	Poor: wetness.
332A*, 332B*--------- Billett	Slight-----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Good.
343*----------------- Kane	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: wetness, seepage.	Poor: too sandy, seepage, wetness.
354A*, 354B*--------- Hononegah	Slight-----------	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.
361B----------------- Kidder	Slight-----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones.
361C2---------------- Kidder	Slight-----------	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: small stones.
361D2, 361D3--------- Kidder	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage, slope.	Fair: slope, small stones.
363B----------------- Griswold	Slight-----------	Moderate: seepage, slope.	Slight-----------	Slight-----------	Fair: small stones.
363C2---------------- Griswold	Slight-----------	Severe: slope.	Slight-----------	Slight-----------	Fair: small stones.
363D2---------------- Griswold	Moderate: slope.	Severe: slope.	Slight-----------	Moderate: slope.	Fair: slope, small stones.
369*----------------- Waupecan	Slight-----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Good.
379A*---------------- Dakota	Slight-----------	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Fair: too clayey.

See footnotes at end of table.

TABLE 9.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
386A Downs	Slight	Moderate: seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
386B Downs	Slight	Moderate: slope, seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
387A*, 387B* Ockley	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too clayey.
398A*, 398B* Wea	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too clayey.
411B Ashdale	Severe: percs slowly.	Moderate: slope, depth to rock.	Severe: depth to rock, too clayey.	Slight	Fair: area reclaim, too clayey.
411C2 Ashdale	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Slight	Fair: area reclaim, too clayey.
412B Ogle	Slight	Moderate: slope, seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
415 Orion	Severe: wetness, floods.	Severe: wetness, floods.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: wetness.
419A Flagg	Moderate: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
419B Flagg	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
419C2 Flagg	Moderate: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight	Fair: too clayey.
429B Palsgrove	Severe: depth to rock.	Moderate: depth to rock, seepage.	Severe: depth to rock.	Slight	Poor: area reclaim.
429C2 Palsgrove	Severe: depth to rock.	Severe: slope.	Severe: depth to rock.	Slight	Poor: area reclaim.
440A Jasper	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Good.
440B Jasper	Moderate: percs slowly.	Moderate: slope, seepage.	Slight	Slight	Good.
440C2 Jasper	Moderate: percs slowly.	Severe: slope.	Slight	Slight	Good.
451 Lawson	Severe: wetness, floods.	Severe: wetness.	Severe: wetness, floods.	Severe: wetness, floods.	Poor: wetness.
490 Odell	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
504C, 504E Sogn	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.

See footnotes at end of table.

TABLE 9.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
505C2---------------- Dunbarton	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: thin layer, area reclaim.
505D2---------------- Dunbarton	Severe: depth to rock.	Severe: slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: thin layer, area reclaim.
505E2---------------- Dunbarton	Severe: slope, depth to rock.	Severe: slope.	Severe: depth to rock.	Severe: slope, depth to rock.	Poor: slope, thin layer, area reclaim.
506A----------------- Hitt	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Slight-----------	Fair: too clayey, area reclaim.
506B----------------- Hitt	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Slight-----------	Fair: too clayey, area reclaim.
506C2---------------- Hitt	Severe: depth to rock.	Severe: slope.	Severe: depth to rock.	Slight-----------	Fair: too clayey, area reclaim.
533**. Urban land					
561B**:					
Whalan-------------	Severe: depth to rock.	Moderate: depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Poor: area reclaim.
NewGlarus----------	Severe: depth to rock, percs slowly.	Moderate: slope, depth to rock.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, area reclaim.
561C2**:					
Whalan-------------	Severe: depth to rock.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock.	Poor: area reclaim.
NewGlarus----------	Severe: depth to rock, percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, area reclaim.
561D2**:					
Whalan-------------	Severe: depth to rock.	Severe: slope.	Severe: depth to rock.	Moderate: slope, depth to rock.	Poor: area reclaim.
NewGlarus----------	Severe: depth to rock, percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: slope, depth to rock.	Poor: too clayey, area reclaim.
566B**:					
Rockton------------	Severe: depth to rock.	Moderate: depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Poor: area reclaim.
Dodgeville---------	Severe: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Slight-----------	Poor: area reclaim, too clayey.
566C2**:					
Rockton------------	Severe: depth to rock.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock.	Poor: area reclaim.

See footnotes at end of table.

TABLE 9.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
566C2**:					
Dodgeville	Severe: depth to rock, percs slowly.	Severe: slope.	Severe: depth to rock.	Slight	Poor: area reclaim, too clayey.
566D2**:					
Rockton	Severe: depth to rock.	Severe: slope.	Severe: depth to rock.	Moderate: slope, depth to rock.	Poor: area reclaim.
Dodgeville	Severe: depth to rock, percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: slope.	Poor: area reclaim, too clayey.
570A, 570B Martinsville	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too clayey.
570C2 Martinsville	Slight	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too clayey.
728B Winnebago	Slight	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
728C2 Winnebago	Slight	Severe: slope.	Moderate: too clayey.	Slight	Fair: too clayey.
728D2 Winnebago	Moderate: slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: slope, too clayey.
768B Backbone	Severe: depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: area reclaim.
768C, 768D Backbone	Severe: depth to rock.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: area reclaim.
769B, 769C Edmund	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
769D2 Edmund	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
771* Hayfield	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: wetness, seepage.	Poor: too sandy.
772* Marshan	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: wetness, seepage.	Poor: wetness, too sandy, seepage.
776 Comfrey	Severe: wetness, floods.	Severe: wetness, floods, seepage.	Severe: wetness, floods, seepage.	Severe: wetness, floods, seepage.	Poor: wetness.
777 Adrian	Severe: wetness, floods.	Severe: wetness, seepage, floods.	Severe: wetness, floods, seepage.	Severe: wetness, floods, seepage.	Poor: hard to pack, wetness.

See footnotes at end of table.

TABLE 9.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
779B*: Chelsea	Slight	Severe: wetness.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.
779C*: Chelsea	Moderate: slope.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.
780B: Grellton	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
780C2: Grellton	Moderate: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight	Fair: too clayey.
781A: Friesland	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Good.
781B: Friesland	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Good.
782: Juneau	Severe: floods, wetness.	Severe: wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Fair: wetness.
783A*, 783B*: Flagler	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: too sandy, seepage.
802**. Orthents					
864**, 865**. Pits					
939C2**:					
Rodman*	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, small stones.
Warsaw*	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: small stones.
939D2**:					
Rodman*	Moderate: slope.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, small stones.
Warsaw*	Moderate: slope.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: small stones.
2145B**: Urban land.					
Saybrook	Moderate: percs slowly, wetness.	Moderate: slope, seepage, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
2354A**: Urban land.					
Hononegah*	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.

See footnotes at end of table.

TABLE 9.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
2363B**: Urban land.					
Griswold	Slight	Moderate: seepage, slope.	Slight	Slight	Fair: small stones.
2363D**: Urban land.					
Griswold	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.	Fair: slope, small stones.
2386B**: Urban land.					
Downs	Slight	Moderate: slope, seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
2398A**: Urban land.					
Wea	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too clayey.
2566B**: Urban land.					
Rockton	Severe: depth to rock.	Moderate: depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Poor: area reclaim.
2776**: Urban land.					
Comfrey	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Poor: wetness.
2781B**: Urban land.					
Friesland	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Good.
2783A**: Urban land.					
Flagler*	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: too sandy, seepage.
4776 Comfrey	Severe: wetness, floods.	Severe: wetness, floods, seepage.	Severe: wetness, floods, seepage.	Severe: wetness, floods, seepage.	Poor: wetness.

*Contamination of ground water is a hazard because of seepage.
** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and "poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
21B, 21C2------------- Pecatonica	Poor: low strength, slope.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
22B, 22C2------------- Westville	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
22D2------------------ Westville	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, slope.
27B, 27C2------------- Miami	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
36A, 36B, 36C2-------- Tama	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
41-------------------- Muscatine	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
59-------------------- Lisbon	Poor: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
61-------------------- Atterberry	Poor: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
62-------------------- Herbert	Poor: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
68-------------------- Sable	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
82-------------------- Millington	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
93E2------------------ Rodman	Fair: slope.	Good.	Good.	Poor: small stones, slope.
100------------------- Palms	Poor: wetness, low strength.	Unsuited: excess humus, excess fines.	Unsuited: excess humus, excess fines.	Poor: wetness, excess humus.
102------------------- La Hogue	Poor: wetness, low strength.	Fair: excess fines.	Unsuited: excess fines.	Good.
103------------------- Houghton	Poor: wetness, low strength.	Unsuited: excess humus.	Unsuited: excess humus.	Poor: wetness, excess humus.
104------------------- Virgil	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
107------------------- Sawmill	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
119B------------------ Elco	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
123*. Riverwash				
125 Selma	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
145B, 145C2 Saybrook	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
146 Elliott	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
152 Drummer	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
172 Hoopeston	Poor: wetness.	Fair: excess fines.	Unsuited: excess fines.	Good.
188 Beardstown	Poor: wetness.	Poor: excess fines.	Unsuited: excess fines.	Fair: thin layer.
197 Troxel	Poor: low strength.	Poor: excess fines.	Unsuited: excess fines.	Good.
198 Elburn	Poor: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
199A, 199B, 199C2 Plano	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
221B, 221C2 Parr	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
223B Varna	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
227B Argyle	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
242 Kendall	Poor: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
243A, 243B, 243C2 St. Charles	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
259B2 Assumption	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
278 Stronghurst	Poor: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
279A Rozetta	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
280B, 280C2 Fayette	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
290A, 290B, 290C2 Warsaw	Fair: low strength.	Good	Good	Good.
293 Andres	Poor: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Good.

See footnote at end of table.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
297B, 297C2 Ringwood	Poor: low strength.	Poor: excess fines.	Unsuited: excess fines.	Fair: thin layer.
310B, 310C2 McHenry	Good	Poor: excess fines.	Unsuited: excess fines.	Fair: thin layer.
327B, 327C2 Fox	Good	Good	Good	Fair: thin layer.
329 Will	Poor: wetness, low strength.	Good	Good	Poor: wetness.
332A, 332B Billett	Good	Fair: excess fines.	Fair: excess fines.	Good.
343 Kane	Poor: wetness.	Good	Good	Fair: thin layer.
354A, 354B Hononegah	Good	Good	Good	Fair: too sandy.
361B, 361C2 Kidder	Good	Poor: excess fines.	Unsuited: excess fines.	Fair: thin layer.
361D2 Kidder	Good	Poor: excess fines.	Unsuited: excess fines.	Fair: thin layer, slope.
361D3 Kidder	Good	Poor: excess fines.	Unsuited: excess fines.	Fair: too clayey, slope.
363B, 363C2 Griswold	Fair: low strength.	Poor: excess fines.	Unsuited: excess fines.	Fair: thin layer.
363D2 Griswold	Fair: low strength.	Poor: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
369 Waupecan	Good	Good	Good	Fair: thin layer.
379A Dakota	Good	Good	Unsuited: excess fines.	Good.
386A, 386B Downs	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
387A, 387B Ockley	Poor: low strength.	Good	Good	Fair: thin layer.
398A, 398B Wea	Poor: low strength.	Good	Good	Fair: thin layer.
411B, 411C2 Ashdale	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
412B Ogle	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
415 Orion	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
419A, 419B, 419C2 Flagg	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
429B, 429C2 Palsgrove	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
440A, 440B, 440C2 Jasper	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
451 Lawson	Poor: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
490 Odell	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
504C, 504E Sogn	Poor: thin layer, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: area reclaim.
505C2, 505D2 Dunbarton	Poor: shrink-swell, thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: area reclaim.
505E2 Dunbarton	Poor: shrink-swell, thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, area reclaim.
506A, 506B, 506C2 Hitt	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
533*. Urban land				
561B*, 561C2*:				
Whalan	Poor: thin layer, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, area reclaim.
NewGlarus	Poor: low strength, thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, area reclaim.
561D2*:				
Whalan	Poor: thin layer, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer, area reclaim.
NewGlarus	Poor: low strength, thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, slope, area reclaim.
566B*, 566C2*:				
Rockton	Poor: low strength, thin layer, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: area reclaim.
Dodgeville	Poor: low strength, thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, area reclaim.
566D2*:				
Rockton	Poor: low strength, thin layer, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, area reclaim.

See footnote at end of table.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
566D2*:				
Dodgeville	Poor: low strength, thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer, area reclaim.
570A, 570B, 570C2 Martinsville	Fair: low strength.	Poor: excess fines.	Unsuited: excess fines.	Fair: thin layer.
728B, 728C2 Winnebago	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
728D2 Winnebago	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
768B, 768C Backbone	Poor: thin layer, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: area reclaim.
768D Backbone	Poor: thin layer, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, area reclaim.
769B, 769C, 769D2 Edmund	Poor: shrink-swell, thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: area reclaim.
771 Hayfield	Fair: wetness.	Good	Poor: excess fines.	Good.
772 Marshan	Poor: wetness.	Good	Unsuited: excess fines.	Poor: wetness.
776 Comfrey	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
777 Adrian	Poor: wetness, low strength.	Unsuited: excess humus.	Unsuited: excess fines, excess humus.	Poor: wetness, excess humus.
779B, 779C Chelsea	Good	Good	Unsuited: excess fines.	Poor: too sandy.
780B, 780C2 Grellton	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
781A, 781B Friesland	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
782 Juneau	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
783A, 783B Flagler	Good	Good	Unsuited: excess fines.	Good.
802*. Orthents				
864*, 865*. Pits				
939C2*:				
Rodman	Good	Good	Good	Poor: small stones.

See footnote at end of table.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
939C2*:				
Warsaw	Fair: low strength.	Good	Good	Good.
939D2*:				
Rodman	Good	Good	Good	Poor: small stones.
Warsaw	Fair: low strength.	Good	Good	Fair: slope.
2145B*:				
Urban land.				
Saybrook	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
2354A*:				
Urban land.				
Hononegah	Good	Good	Good	Fair: too sandy.
2363B*:				
Urban land.				
Griswold	Fair: low strength.	Poor: excess fines.	Unsuited: excess fines.	Fair: thin layer.
2363D*:				
Urban land.				
Griswold	Fair: low strength.	Poor: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
2386B*:				
Urban land.				
Downs	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
2398A*:				
Urban land.				
Wea	Poor: low strength.	Good	Good	Fair: thin layer.
2566B*:				
Urban land.				
Rockton	Poor: low strength, thin layer, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: area reclaim.
2776*:				
Urban land.				
Comfrey	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
2781B*:				
Urban land.				
Friesland	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.

See footnote at end of table.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
2783A*: Urban land.				
Flagler	Good	Good	Unsuited: excess fines.	Good.
4776 Comfrey	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
21B Pecatonica	Seepage	Favorable	Not needed	Erodes easily	Favorable	Erodes easily.
21C2 Pecatonica	Slope, seepage.	Favorable	Not needed	Erodes easily, slope.	Favorable	Erodes easily.
22B Westville	Seepage	Favorable	Not needed	Erodes easily	Favorable	Erodes easily.
22C2 Westville	Slope, seepage.	Favorable	Not needed	Erodes easily, slope.	Favorable	Erodes easily.
22D2 Westville	Slope, seepage.	Favorable	Not needed	Erodes easily, slope.	Slope	Slope, erodes easily.
27B Miami	Seepage	Piping	Not needed	Erodes easily	Favorable	Erodes easily.
27C2 Miami	Slope, seepage.	Piping	Not needed	Slope, erodes easily.	Favorable	Erodes easily.
36A Tama	Seepage	Favorable	Not needed	Favorable	Not needed	Erodes easily.
36B Tama	Seepage	Favorable	Not needed	Favorable	Erodes easily	Erodes easily.
36C2 Tama	Slope, seepage.	Favorable	Not needed	Slope	Erodes easily	Erodes easily.
41 Muscatine	Seepage	Wetness	Frost action	Wetness	Not needed	Erodes easily.
59 Lisbon	Seepage	Wetness	Frost action	Wetness	Not needed	Wetness.
61 Atterberry	Favorable	Hard to pack, wetness.	Frost action	Wetness	Not needed	Wetness, erodes easily.
62 Herbert	Seepage	Wetness	Frost action	Wetness	Not needed	Wetness, erodes easily.
68 Sable	Seepage	Wetness	Frost action, floods.	Wetness	Not needed	Wetness.
82 Millington	Seepage	Wetness	Floods, frost action.	Wetness, floods.	Not needed	Wetness.
93E2 Rodman	Slope, seepage.	Seepage	Not needed	Slope, droughty.	Slope, too sandy.	Slope, droughty.
100 Palms	Seepage	Excess humus, wetness.	Floods, frost action.	Wetness, soil blowing, floods.	Not needed	Wetness.
102 La Hogue	Seepage	Wetness	Frost action	Wetness	Not needed	Wetness.
103 Houghton	Seepage	Excess humus, low strength.	Frost action, excess humus.	Soil blowing, wetness, floods.	Not needed	Wetness.
104 Virgil	Seepage	Wetness	Frost action	Wetness, erodes easily.	Not needed	Wetness, erodes easily.
107 Sawmill	Favorable	Wetness	Floods, frost action.	Wetness, floods.	Not needed	Wetness.

TABLE 11.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
119B: Elco	Favorable	Wetness	Frost action	Erodes easily, wetness.	Wetness	Erodes easily.
123*. Riverwash						
125: Selma	Seepage	Wetness	Floods, frost action.	Wetness, floods.	Not needed	Wetness.
145B: Saybrook	Seepage	Favorable	Not needed	Favorable	Erodes easily	Erodes easily.
145C2: Saybrook	Slope, seepage.	Favorable	Not needed	Slope	Erodes easily	Erodes easily.
146: Elliott	Favorable	Wetness, hard to pack.	Frost action	Wetness	Not needed	Wetness.
152: Drummer	Seepage	Wetness	Frost action, floods.	Wetness, floods.	Not needed	Wetness.
172: Hoopeston	Seepage	Seepage	Frost action	Wetness, soil blowing.	Not needed	Wetness.
188: Beardstown	Seepage	Wetness, seepage.	Frost action	Wetness	Not needed	Wetness.
197: Troxel	Seepage	Favorable	Not needed	Floods	Not needed	Favorable.
198: Elburn	Seepage	Wetness	Frost action	Wetness	Not needed	Wetness, erodes easily.
199A: Plano	Seepage	Favorable	Not needed	Favorable	Not needed	Erodes easily.
199B: Plano	Seepage	Favorable	Not needed	Favorable	Erodes easily	Erodes easily.
199C2: Plano	Slope, seepage.	Favorable	Not needed	Slope	Erodes easily	Erodes easily.
221B: Parr	Favorable	Favorable	Not needed	Favorable	Favorable	Favorable.
221C2: Parr	Slope	Favorable	Not needed	Slope	Favorable	Favorable.
223B: Varna	Favorable	Favorable	Not needed	Favorable	Percs slowly	Percs slowly.
227B: Argyle	Seepage	Favorable	Not needed	Favorable	Favorable	Favorable.
242: Kendall	Seepage	Wetness	Frost action	Wetness, erodes easily.	Not needed	Wetness, erodes easily.
243A: St. Charles	Seepage	Favorable	Not needed	Erodes easily	Not needed	Erodes easily.
243B: St. Charles	Seepage	Favorable	Not needed	Erodes easily	Favorable	Erodes easily.
243C2: St. Charles	Seepage	Favorable	Not needed	Slope, erodes easily.	Favorable	Erodes easily.
259B2: Assumption	Favorable	Favorable	Not needed	Favorable	Erodes easily	Erodes easily.

See footnote at end of table.

TABLE 11.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
278-------------- Stronghurst	Seepage--------	Wetness--------	Frost action---	Wetness, erodes easily.	Not needed-----	Erodes easily, wetness.
279A------------- Rozetta	Seepage--------	Favorable------	Not needed-----	Erodes easily	Favorable------	Erodes easily.
280B------------- Fayette	Seepage--------	Favorable------	Not needed-----	Erodes easily	Favorable------	Erodes easily.
280C2------------ Fayette	Slope, seepage.	Favorable------	Not needed-----	Slope, erodes easily.	Favorable------	Erodes easily.
290A------------- Warsaw	Seepage--------	Seepage--------	Not needed-----	Favorable------	Not needed-----	Favorable.
290B------------- Warsaw	Seepage--------	Seepage--------	Not needed-----	Favorable------	Too sandy------	Favorable.
290C2------------ Warsaw	Seepage--------	Seepage--------	Not needed-----	Slope----------	Too sandy------	Favorable.
293-------------- Andres	Favorable------	Wetness, hard to pack.	Frost action---	Wetness--------	Not needed-----	Wetness, erodes easily.
297B------------- Ringwood	Seepage--------	No water-------	Not needed-----	Favorable------	Erodes easily	Erodes easily.
297C2------------ Ringwood	Seepage--------	No water-------	Not needed-----	Slope----------	Erodes easily	Erodes easily.
310B------------- McHenry	Seepage--------	Favorable------	Not needed-----	Erodes easily	Favorable------	Erodes easily.
310C2------------ McHenry	Slope, seepage.	Favorable------	Not needed-----	Erodes easily, slope.	Favorable------	Erodes easily.
327B------------- Fox	Seepage--------	Seepage--------	Not needed-----	Erodes easily	Too sandy------	Erodes easily.
327C2------------ Fox	Seepage, slope.	Seepage--------	Not needed-----	Slope, erodes easily.	Too sandy------	Erodes easily.
329-------------- Will	Seepage--------	Seepage--------	Floods, frost action.	Wetness, floods.	Not needed-----	Wetness.
332A------------- Billett	Seepage--------	Seepage--------	Not needed-----	Soil blowing---	Not needed-----	Favorable.
332B------------- Billett	Seepage--------	Seepage--------	Not needed-----	Soil blowing---	Too sandy, soil blowing.	Favorable.
343-------------- Kane	Seepage--------	Seepage--------	Frost action---	Wetness--------	Not needed-----	Wetness.
354A------------- Hononegah	Seepage--------	Seepage--------	Not needed-----	Droughty, fast intake, soil blowing.	Not needed-----	Droughty.
354B------------- Hononegah	Seepage--------	Seepage--------	Not needed-----	Droughty, fast intake, soil blowing.	Soil blowing, too sandy.	Droughty.
361B------------- Kidder	Seepage--------	Seepage--------	Not needed-----	Favorable------	Favorable------	Favorable.
361C2------------ Kidder	Seepage, slope.	Seepage--------	Not needed-----	Slope----------	Favorable------	Favorable.
361D2, 361D3------ Kidder	Seepage, slope.	Seepage--------	Not needed-----	Slope----------	Slope----------	Slope.

TABLE 11.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
363B: Griswold	Seepage	Favorable	Not needed	Soil blowing	Soil blowing	Favorable.
363C2: Griswold	Slope, seepage.	Favorable	Not needed	Soil blowing, slope.	Soil blowing	Favorable.
363D2: Griswold	Slope, seepage.	Favorable	Not needed	Soil blowing, slope.	Soil blowing, slope.	Slope.
369: Waupecan	Seepage	Seepage	Not needed	Favorable	Not needed	Erodes easily.
379A: Dakota	Seepage	Seepage	Not needed	Favorable	Not needed	Favorable.
386A: Downs	Seepage	Favorable	Not needed	Favorable	Not needed	Erodes easily.
386B: Downs	Seepage	Favorable	Not needed	Favorable	Erodes easily	Erodes easily.
387A: Ockley	Seepage	Thin layer	Not needed	Erodes easily	Not needed	Erodes easily.
387B: Ockley	Seepage	Thin layer	Not needed	Erodes easily	Favorable	Erodes easily.
398A: Wea	Seepage	Favorable	Not needed	Favorable	Not needed	Erodes easily.
398B: Wea	Seepage	Favorable	Not needed	Favorable	Erodes easily	Erodes easily.
411B: Ashdale	Depth to rock, seepage.	Thin layer	Not needed	Favorable	Erodes easily	Erodes easily.
411C2: Ashdale	Slope, seepage, depth to rock.	Thin layer	Not needed	Slope	Erodes easily	Erodes easily.
412B: Ogle	Seepage	Favorable	Not needed	Favorable	Erodes easily	Erodes easily.
415: Orion	Seepage	Wetness	Floods, frost action.	Floods, erodes easily, wetness.	Not needed	Wetness, erodes easily.
419A: Flagg	Seepage	Favorable	Not needed	Erodes easily	Not needed	Erodes easily.
419B: Flagg	Seepage	Favorable	Not needed	Erodes easily	Favorable	Erodes easily.
419C2: Flagg	Slope	Favorable	Not needed	Slope, erodes easily.	Favorable	Erodes easily.
429B: Palsgrove	Depth to rock	Thin layer	Not needed	Favorable	Erodes easily	Erodes easily.
429C2: Palsgrove	Slope, depth to rock.	Thin layer	Not needed	Slope	Erodes easily	Erodes easily.
440A: Jasper	Seepage	Favorable	Not needed	Favorable	Not needed	Favorable.
440B: Jasper	Seepage	Favorable	Not needed	Favorable	Favorable	Favorable.
440C2: Jasper	Slope, seepage.	Favorable	Not needed	Slope	Favorable	Favorable.

TABLE 11.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
451 Lawson	Seepage	Wetness	Floods, frost action.	Wetness, floods.	Not needed	Wetness.
490 Odell	Favorable	Piping, wetness.	Frost action	Wetness	Not needed	Wetness.
504C Sogn	Slope, depth to rock.	Thin layer	Not needed	Droughty, rooting depth, slope.	Depth to rock	Slope, droughty, rooting depth.
504E Sogn	Slope, depth to rock.	Thin layer	Not needed	Droughty, rooting depth, slope.	Depth to rock, slope.	Slope, droughty, rooting depth.
505C2 Dunbarton	Depth to rock	Thin layer	Not needed	Rooting depth	Depth to rock	Rooting depth, erodes easily.
505D2 Dunbarton	Slope, depth to rock.	Thin layer	Not needed	Slope, rooting depth.	Depth to rock	Slope, rooting depth, erodes easily.
505E2 Dunbarton	Slope, depth to rock.	Thin layer	Not needed	Slope, rooting depth.	Slope, depth to rock.	Slope, rooting depth, erodes easily.
506A Hitt	Depth to rock, seepage.	Thin layer	Not needed	Favorable	Not needed	Favorable.
506B Hitt	Depth to rock, seepage.	Thin layer	Not needed	Favorable	Favorable	Favorable.
506C2 Hitt	Slope, depth to rock, seepage.	Thin layer	Not needed	Slope	Favorable	Favorable.
533*. Urban land						
561B*:						
Whalan	Depth to rock	Thin layer	Not needed	Rooting depth	Depth to rock	Depth to rock.
NewGlarus	Depth to rock	Thin layer, hard to pack.	Not needed	Rooting depth, erodes easily.	Depth to rock	Erodes easily, depth to rock.
561C2*:						
Whalan	Slope, depth to rock.	Thin layer	Not needed	Slope, rooting depth.	Depth to rock	Depth to rock.
NewGlarus	Slope, depth to rock.	Thin layer, hard to pack.	Not needed	Slope, rooting depth, erodes easily.	Depth to rock	Erodes easily, depth to rock.
561D2*:						
Whalan	Slope, depth to rock.	Thin layer	Not needed	Slope, rooting depth.	Depth to rock, slope.	Slope, depth to rock.
NewGlarus	Slope, depth to rock.	Thin layer, hard to pack.	Not needed	Slope, rooting depth, erodes easily.	Slope, depth to rock.	Slope, erodes easily, depth to rock.
566B*:						
Rockton	Depth to rock, seepage.	Thin layer	Not needed	Rooting depth	Depth to rock	Depth to rock.
Dodgeville	Depth to rock, seepage.	Thin layer, hard to pack.	Not needed	Rooting depth	Depth to rock, erodes easily.	Erodes easily, depth to rock.

See footnote at end of table.

TABLE 11.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
566C2*:						
Rockton	Slope, seepage, depth to rock.	Thin layer	Not needed	Slope, rooting depth.	Depth to rock	Depth to rock.
Dodgeville	Slope, depth to rock, seepage.	Thin layer, hard to pack.	Not needed	Rooting depth, slope.	Depth to rock, erodes easily.	Erodes easily, depth to rock.
566D2*:						
Rockton	Slope, seepage, depth to rock.	Thin layer	Not needed	Slope, rooting depth.	Slope, depth to rock.	Depth to rock, slope.
Dodgeville	Slope, depth to rock, seepage.	Thin layer, hard to pack.	Not needed	Rooting depth, slope.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
570A Martinsville	Seepage	Favorable	Not needed	Favorable	Not needed	Erodes easily.
570B Martinsville	Seepage	Favorable	Not needed	Favorable	Favorable	Erodes easily.
570C2 Martinsville	Slope, seepage.	Favorable	Not needed	Slope	Favorable	Erodes easily.
728B Winnebago	Seepage	Favorable	Not needed	Favorable	Favorable	Favorable.
728C2 Winnebago	Slope, seepage.	Favorable	Not needed	Slope	Favorable	Favorable.
728D2 Winnebago	Slope, seepage.	Favorable	Not needed	Slope	Slope	Slope.
768B Backbone	Depth to rock, seepage.	Thin layer	Not needed	Rooting depth, soil blowing.	Depth to rock, soil blowing.	Depth to rock.
768C Backbone	Slope, depth to rock, seepage.	Thin layer	Not needed	Rooting depth, soil blowing, slope.	Depth to rock, soil blowing.	Depth to rock.
768D Backbone	Slope, depth to rock, seepage.	Thin layer	Not needed	Rooting depth, soil blowing, slope.	Slope, depth to rock, soil blowing.	Slope, depth to rock.
769B, 769C Edmund	Depth to rock	Thin layer	Not needed	Rooting depth, erodes easily.	Depth to rock	Erodes easily, rooting depth.
769D2 Edmund	Depth to rock, slope.	Thin layer	Not needed	Rooting depth, slope, erodes easily.	Depth to rock	Slope, erodes easily, rooting depth.
771 Hayfield	Seepage	Seepage	Frost action	Wetness	Not needed	Favorable.
772 Marshan	Seepage	Wetness, seepage.	Frost action	Wetness	Not needed	Wetness.
776 Comfrey	Seepage	Wetness	Floods, frost action.	Wetness, floods.	Not needed	Wetness.
777 Adrian	Seepage	Seepage, wetness.	Floods, frost action.	Wetness, fast intake, soil blowing.	Not needed	Wetness.
779B Chelsea	Seepage	Piping, seepage.	Not needed	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.

See footnote at end of table.

TABLE 11.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
779C Chelsea	Slope, seepage.	Piping, seepage.	Not needed	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Slope, droughty.
780B Grellton	Seepage	Favorable	Not needed	Soil blowing	Slope, soil blowing.	Favorable.
780C2 Grellton	Seepage, slope.	Favorable	Not needed	Slope, soil blowing.	Slope, soil blowing.	Favorable.
781A Friesland	Seepage	Piping	Not needed	Soil blowing	Not needed	Erodes easily.
781B Friesland	Seepage	Piping	Not needed	Soil blowing	Soil blowing	Erodes easily.
782 Juneau	Seepage	Wetness	Floods, frost action.	Wetness, erodes easily, floods.	Not needed	Erodes easily.
783A Flagler	Seepage	Seepage	Not needed	Droughty, fast intake, soil blowing.	Not needed	Droughty.
783B Flagler	Seepage	Seepage	Not needed	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
802*. Orthents						
864*, 865*. Pits						
939C2*:						
Rodman	Seepage	Seepage	Not needed	Droughty	Too sandy	Droughty.
Warsaw	Seepage	Seepage	Not needed	Favorable	Too sandy	Favorable.
939D2*:						
Rodman	Slope, seepage.	Seepage	Not needed	Slope, droughty.	Too sandy	Slope, droughty.
Warsaw	Seepage	Seepage	Not needed	Slope	Too sandy	Slope.
2145B*: Urban land.						
Saybrook	Seepage	Favorable	Not needed	Favorable	Erodes easily	Erodes easily.
2354A*: Urban land.						
Hononegah	Seepage	Seepage	Not needed	Droughty, fast intake, soil blowing.	Not needed	Droughty.
2363B*: Urban land.						
Griswold	Seepage	Favorable	Not needed	Soil blowing	Soil blowing	Favorable.
2363D*: Urban land.						
Griswold	Slope, seepage.	Favorable	Not needed	Soil blowing, slope.	Soil blowing	Slope.
2386B*: Urban land.						

See footnote at end of table.

TABLE 11.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
2386B*:						
Downs	Seepage	Favorable	Not needed	Favorable	Erodes easily	Erodes easily.
2398A*:						
Urban land.						
Wea	Seepage	Favorable	Not needed	Favorable	Not needed	Erodes easily.
2566B*:						
Urban land.						
Rockton	Depth to rock, seepage.	Thin layer	Not needed	Rooting depth	Depth to rock	Depth to rock.
2776*:						
Urban land.						
Comfrey	Seepage	Wetness	Floods, frost action.	Wetness, floods.	Not needed	Wetness.
2781B*:						
Urban land.						
Friesland	Seepage	Piping	Not needed	Soil blowing	Soil blowing	Erodes easily.
2783A*:						
Urban land.						
Flagler	Seepage	Seepage	Not needed	Droughty, fast intake, soil blowing.	Not needed	Droughty.
4776 Comfrey	Seepage	Wetness	Floods, frost action.	Wetness, floods.	Not needed	Wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
21B: Pecatonica	Slight	Slight	Moderate: slope.	Slight.
21C2: Pecatonica	Slight	Slight	Severe: slope.	Slight.
22B: Westville	Slight	Slight	Moderate: slope.	Slight.
22C2: Westville	Slight	Slight	Severe: slope.	Slight.
22D2: Westville	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
27B: Miami	Slight	Slight	Moderate: slope.	Slight.
27C2: Miami	Slight	Slight	Severe: slope.	Slight.
36A: Tama	Slight	Slight	Slight	Slight.
36B: Tama	Slight	Slight	Moderate: slope.	Slight.
36C2: Tama	Slight	Slight	Severe: slope.	Slight.
41: Muscatine	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight.
59: Lisbon	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
61: Atterberry	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
62: Herbert	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
68: Sable	Severe: wetness, floods.	Severe: wetness.	Severe: wetness.	Severe: wetness.
82: Millington	Severe: wetness, floods.	Severe: wetness.	Severe: wetness, floods.	Severe: wetness.
93E2: Rodman	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
100: Palms	Severe: wetness, floods, excess humus.	Severe: wetness, excess humus.	Severe: wetness, floods, excess humus.	Severe: wetness, excess humus.
102: La Hogue	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
103 Houghton	Severe: wetness, floods, excess humus.	Severe: wetness, excess humus.	Severe: wetness, floods, excess humus.	Severe: wetness, excess humus.
104 Virgil	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
107 Sawmill	Severe: floods, wetness.	Severe: wetness.	Severe: wetness, floods.	Severe: wetness.
119B Elco	Moderate: percs slowly.	Slight	Moderate: slope, percs slowly.	Slight.
123*. Riverwash				
125 Selma	Severe: wetness, floods.	Severe: wetness.	Severe: wetness.	Severe: wetness.
145B Saybrook	Slight	Slight	Moderate: slope.	Slight.
145C2 Saybrook	Slight	Slight	Severe: slope.	Slight.
146 Elliott	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
152 Drummer	Severe: wetness, floods.	Severe: wetness.	Severe: wetness.	Severe: wetness.
172 Hoopeston	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
188 Beardstown	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
197 Troxel	Severe: floods.	Slight	Moderate: floods.	Slight.
198 Elburn	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
199A Plano	Slight	Slight	Slight	Slight.
199B Plano	Slight	Slight	Moderate: slope.	Slight.
199C2 Plano	Slight	Slight	Severe: slope.	Slight.
221B Parr	Slight	Slight	Moderate: slope.	Slight.
221C2 Parr	Slight	Slight	Severe: slope.	Slight.
223B Varna	Moderate: percs slowly.	Slight	Moderate: percs slowly, slope.	Slight.

See footnote at end of table.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
227B Argyle	Slight	Slight	Moderate: slope.	Slight.
242 Kendall	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
243A St. Charles	Slight	Slight	Slight	Slight.
243B St. Charles	Slight	Slight	Moderate: slope.	Slight.
243C2 St. Charles	Slight	Slight	Severe: slope.	Slight.
259B2 Assumption	Slight	Slight	Moderate: slope.	Slight.
278 Stronghurst	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
279A Rozetta	Slight	Slight	Moderate: slope.	Slight.
280B Fayette	Slight	Slight	Moderate: slope.	Slight.
280C2 Fayette	Slight	Slight	Severe: slope.	Slight.
290A Warsaw	Slight	Slight	Slight	Slight.
290B Warsaw	Slight	Slight	Moderate: slope.	Slight.
290C2 Warsaw	Slight	Slight	Severe: slope.	Slight.
293 Andres	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
297B Ringwood	Slight	Slight	Moderate: slope.	Slight.
297C2 Ringwood	Slight	Slight	Severe: slope.	Slight.
310B McHenry	Slight	Slight	Moderate: slope.	Slight.
310C2 McHenry	Slight	Slight	Severe: slope.	Slight.
327B Fox	Slight	Slight	Moderate: slope.	Slight.
327C2 Fox	Slight	Slight	Severe: slope.	Slight.
329 Will	Severe: wetness, floods.	Severe: wetness.	Severe: wetness, floods.	Severe: wetness.
332A Billett	Slight	Slight	Slight	Slight.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
332B-----Billett	Slight-----	Slight-----	Moderate: slope.	Slight.
343-----Kane	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
354A-----Hononegah	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.
354B-----Hononegah	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.
361B-----Kidder	Slight-----	Slight-----	Moderate: slope.	Slight.
361C2-----Kidder	Slight-----	Slight-----	Severe: slope.	Slight.
361D2-----Kidder	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
361D3-----Kidder	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.
363B-----Griswold	Slight-----	Slight-----	Moderate: slope.	Slight.
363C2-----Griswold	Slight-----	Slight-----	Severe: slope.	Slight.
363D2-----Griswold	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
369-----Waupecan	Slight-----	Slight-----	Slight-----	Slight.
379A-----Dakota	Slight-----	Slight-----	Slight-----	Slight.
386A-----Downs	Slight-----	Slight-----	Slight-----	Slight.
386B-----Downs	Slight-----	Slight-----	Moderate: slope.	Slight.
387A-----Ockley	Slight-----	Slight-----	Slight-----	Slight.
387B-----Ockley	Slight-----	Slight-----	Moderate: slope.	Slight.
398A-----Wea	Slight-----	Slight-----	Slight-----	Slight.
398B-----Wea	Slight-----	Slight-----	Moderate: slope.	Slight.
411B-----Ashdale	Moderate: percs slowly.	Slight-----	Moderate: slope, percs slowly.	Slight.
411C2-----Ashdale	Moderate: percs slowly.	Slight-----	Severe: slope.	Slight.
412B-----Ogle	Slight-----	Slight-----	Moderate: slope.	Slight.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
415 Orion	Severe: floods, wetness.	Moderate: wetness, floods.	Severe: wetness, floods.	Moderate: wetness, floods.
419A Flagg	Slight	Slight	Slight	Slight.
419B Flagg	Slight	Slight	Moderate: slope.	Slight.
419C2 Flagg	Slight	Slight	Severe: slope.	Slight.
429B Palsgrove	Moderate: percs slowly.	Slight	Moderate: slope, percs slowly.	Slight.
429C2 Palsgrove	Moderate: percs slowly.	Slight	Severe: slope.	Slight.
440A Jasper	Slight	Slight	Slight	Slight.
440B Jasper	Slight	Slight	Moderate: slope.	Slight.
440C2 Jasper	Slight	Slight	Severe: slope.	Slight.
451 Lawson	Severe: floods, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
490 Odell	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
504C Sogn	Severe: depth to rock.	Moderate: slope.	Severe: depth to rock, slope.	Slight.
504E Sogn	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Slight.
505C2 Dunbarton	Moderate: percs slowly.	Slight	Severe: depth to rock.	Slight.
505D2 Dunbarton	Moderate: slope, percs slowly.	Moderate: slope.	Severe: slope, depth to rock.	Slight.
505E2 Dunbarton	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.	Moderate: slope.
506A Hitt	Slight	Slight	Slight	Slight.
506B Hitt	Slight	Slight	Moderate: slope.	Slight.
506C2 Hitt	Slight	Slight	Severe: slope.	Slight.
533*. Urban land				

See footnote at end of table.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
561B*:				
Whalan	Moderate: percs slowly.	Slight	Moderate: depth to rock, slope, percs slowly.	Slight.
NewGlarus	Moderate: percs slowly.	Slight	Moderate: slope, depth to rock, percs slowly.	Slight.
561C2*:				
Whalan	Moderate: percs slowly.	Slight	Severe: slope.	Slight.
NewGlarus	Moderate: percs slowly.	Slight	Severe: slope.	Slight.
561D2*:				
Whalan	Moderate: slope, percs slowly.	Moderate: slope.	Severe: slope.	Slight.
NewGlarus	Moderate: slope, percs slowly.	Moderate: slope.	Severe: slope.	Slight.
566B*:				
Rockton	Slight	Slight	Moderate: depth to rock, slope.	Slight.
Dodgeville	Moderate: percs slowly.	Slight	Moderate: slope, depth to rock, percs slowly.	Slight.
566C2*:				
Rockton	Slight	Slight	Severe: slope.	Slight.
Dodgeville	Moderate: percs slowly.	Slight	Severe: slope.	Slight.
566D2*:				
Rockton	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Dodgeville	Moderate: slope, percs slowly.	Moderate: slope.	Severe: slope.	Slight.
570A Martinsville	Slight	Slight	Slight	Slight.
570B Martinsville	Slight	Slight	Moderate: slope.	Slight.
570C2 Martinsville	Slight	Slight	Severe: slope.	Slight.
728B Winnebago	Slight	Slight	Moderate: slope.	Slight.
728C2 Winnebago	Slight	Slight	Severe: slope.	Slight.

See footnote at end of table.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
728D2 Winnebago	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
768B Backbone	Slight	Slight	Moderate: slope, depth to rock.	Slight.
768C Backbone	Slight	Slight	Severe: slope.	Slight.
768D Backbone	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
769B, 769C Edmund	Moderate: percs slowly.	Moderate: too clayey.	Severe: depth to rock.	Moderate: too clayey.
769D2 Edmund	Moderate: slope, percs slowly.	Moderate: slope, too clayey.	Severe: slope, depth to rock.	Moderate: too clayey.
771 Hayfield	Slight	Slight	Slight	Slight.
772 Marshan	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
776 Comfrey	Severe: wetness, floods.	Severe: wetness.	Severe: wetness, floods.	Severe: wetness.
777 Adrian	Severe: wetness, floods, excess humus.	Severe: wetness, excess humus.	Severe: wetness, floods, excess humus.	Severe: wetness, excess humus.
779B Chelsea	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy, slope.	Moderate: too sandy.
779C Chelsea	Moderate: too sandy, slope.	Moderate: too sandy, slope.	Severe: slope.	Moderate: too sandy.
780B Grellton	Slight	Slight	Moderate: slope.	Slight.
780C2 Grellton	Slight	Slight	Severe: slope.	Slight.
781A Friesland	Slight	Slight	Slight	Slight.
781B Friesland	Slight	Slight	Moderate: slope.	Slight.
782 Juneau	Severe: floods.	Slight	Moderate: floods.	Slight.
783A Flagler	Slight	Slight	Slight	Slight.
783B Flagler	Slight	Slight	Moderate: slope.	Slight.
802*. Orthents				

See footnote at end of table.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
864*, 865*. Pits				
939C2*:				
Rodman	Slight	Slight	Moderate: slope, small stones.	Slight.
Warsaw	Slight	Slight	Moderate: slope.	Slight.
939D2*:				
Rodman	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Warsaw	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
2145B*: Urban land.				
Saybrook	Slight	Slight	Moderate: slope.	Slight.
2354A*: Urban land.				
Hononegah	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.
2363B*: Urban land.				
Griswold	Slight	Slight	Moderate: slope.	Slight.
2363D*: Urban land.				
Griswold	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
2386B*: Urban land.				
Downs	Slight	Slight	Moderate: slope.	Slight.
2398A*: Urban land.				
Wea	Slight	Slight	Slight	Slight.
2566B*: Urban land.				
Rockton	Slight	Slight	Moderate: depth to rock, slope.	Slight.
2776*: Urban land.				
Comfrey	Severe: wetness, floods.	Severe: wetness.	Severe: wetness, floods.	Severe: wetness.

See footnote at end of table.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
2781B*: Urban land.				
Friesland	Slight	Slight	Moderate: slope.	Slight.
2783A*: Urban land.				
Flagler	Slight	Slight	Slight	Slight.
4776 Comfrey	Severe: wetness, floods.	Severe: wetness.	Severe: wetness, floods.	Severe: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
21B, 21C2 Pecatonica	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
22B, 22C2 Westville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
22D2 Westville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
27B Miami	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
27C2 Miami	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
36A, 36B Tama	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
36C2 Tama	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
41 Muscatine	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
59 Lisbon	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
61 Atterberry	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
62 Herbert	Good	Good	Good	Good	Fair	Fair	Fair	Good	Good	Fair.
68 Sable	Fair	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
82 Millington	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
93E2 Rodman	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
100 Palms	Poor	Poor	Poor	Poor	Poor	Good	Good	Fair	Poor	Good.
102 La Hogue	Good	Good	Good	Good	Fair	Fair	Poor	Good	Good	Poor.
103 Houghton	Fair	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
104 Virgil	Good	Good	Good	Good	Fair	Fair	Fair	Good	Good	Fair.
107 Sawmill	Good	Good	Good	Fair	Fair	Poor	Poor	Good	Fair	Poor.
119B Elco	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
123*. Riverwash										

See footnote at end of table.

TABLE 13.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
125----------------- Selma	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
145B---------------- Saybrook	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
145C2--------------- Saybrook	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
146----------------- Elliott	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
152----------------- Drummer	Fair	Good	Good	Fair	Fair	Poor	Poor	Good	Fair	Poor.
172----------------- Hoopeston	Fai,	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
188----------------- Beardstown	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
197----------------- Troxel	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
198----------------- Elburn	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
199A, 199B---------- Plano	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
199C2--------------- Plano	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
221B---------------- Parr	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
221C2--------------- Parr	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
223B---------------- Varna	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
227B---------------- Argyle	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
242----------------- Kendall	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
243A, 243B---------- St. Charles	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
243C2--------------- St. Charles	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
259B2--------------- Assumption	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
278----------------- Stronghurst	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
279A---------------- Rozetta	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
280B---------------- Fayette	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

TABLE 13.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Conif- erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
280C2 Fayette	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
290A, 290B Warsaw	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
290C2 Warsaw	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
293 Andres	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
297B, 297C2 Ringwood	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
310B McHenry	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
310C2 McHenry	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
327B Fox	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
327C2 Fox	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
329 Will	Fair	Good	Good	Good	Fair	Poor	Poor	Good	Good	Poor.
332A, 332B Billett	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
343 Kane	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
354A, 354B Hononegah	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
361B Kidder	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
361C2 Kidder	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
361D2, 361D3 Kidder	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
363B Griswold	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
363C2, 363D2 Griswold	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
369 Waupecan	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
379A Dakota	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
386A, 386B Downs	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
387A, 387B Ockley	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

TABLE 13.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
398A, 398B--------- Wea	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
411B--------------- Ashdale	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
411C2-------------- Ashdale	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
412B--------------- Ogle	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
415---------------- Orion	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
419A, 419B--------- Flagg	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
419C2-------------- Flagg	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
429B--------------- Palsgrove	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
429C2-------------- Palsgrove	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
440A, 440B--------- Jasper	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
440C2-------------- Jasper	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
451---------------- Lawson	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
490---------------- Odell	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
504C, 504E--------- Sogn	Very poor.	Very poor.	Poor	---	---	Very poor.	Very poor.	Very poor.	---	Very poor.
505C2, 505D2------- Dunbarton	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
505E2-------------- Dunbarton	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
506A, 506B, 506C2-- Hitt	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
533*. Urban land										
561B*, 561C2*:										
Whalan------------	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
NewGlarus---------	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
561D2*:										
Whalan------------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

TABLE 13.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
561D2*:										
NewGlarus	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
566B*:										
Rockton	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Dodgeville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
566C2*:										
Rockton	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Dodgeville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
566D2*:										
Rockton	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Dodgeville	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
570A, 570B Martinsville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
570C2 Martinsville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
728B, 728C2 Winnebago	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
728D2 Winnebago	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
768B Backbone	Fair	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
768C, 768D Backbone	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
769B, 769C, 769D2 Edmund	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
771 Hayfield	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
772 Marshan	Good	Good	Good	Fair	Poor	Good	Good	Good	Fair	Good.
776 Comfrey	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
777 Adrian	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
779B Chelsea	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
779C Chelsea	Very poor.	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
780B Grellton	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 13.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
780C2 Grellton	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
781A, 781B Friesland	Good	Good	Good	Poor	Poor	Very poor.	Very poor.	Good	Poor	Very poor.
782 Juneau	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
783A Flagler	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
783B Flagler	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
802*. Orthents										
864*, 865*. Pits										
939C2*:										
Rodman	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Warsaw	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
939D2*:										
Rodman	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Warsaw	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
2145B*:										
Urban land.										
Saybrook	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
2354A*:										
Urban land.										
Hononegah	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
2363B*:										
Urban land.										
Griswold	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
2363D*:										
Urban land.										
Griswold	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
2386B*:										
Urban land.										
Downs	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 13.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
2398A*: Urban land.										
Wea	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
2566B*: Urban land.										
Rockton	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
2776*: Urban land.										
Comfrey	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
2781B*: Urban land.										
Friesland	Good	Good	Good	Poor	Poor	Very poor.	Very poor.	Good	Poor	Very poor.
2783A*: Urban land.										
Flagler	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
4776 Comfrey	Poor	Poor	Fair	Very poor.	Very poor.	Good	Good	Poor	Poor	Good.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS

[The syumbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
21B, 21C2----------- Pecatonica	0-12	Silt loam-------	ML, CL	A-6, A-4	0	100	100	90-100	80-95	25-40	3-15
	12-24	Silt loam, loam	ML, CL	A-6, A-4	0	100	100	90-100	70-90	25-40	3-15
	24-58	Sandy clay loam, clay loam, loam.	CL	A-6, A-7	0-5	90-100	90-100	80-90	60-90	30-45	10-20
	58-65	Sandy loam, loam	SM, SC, CL, ML	A-4, A-2, A-6	0-5	90-100	90-100	60-90	30-70	15-30	3-11
22B, 22C2---------- Westville	0-8	Silt loam-------	CL-ML, CL	A-6, A-4	0	100	100	90-100	70-90	25-40	4-15
	8-60	Clay loam, sandy clay loam.	CL	A-6, A-7-6	0-5	90-100	90-100	80-90	60-90	30-45	11-19
22D2--------------- Westville	0-6	Silt loam-------	CL-ML, CL	A-6, A-4	0	100	100	90-100	70-90	25-40	4-15
	6-48	Clay loam, sandy clay loam.	CL	A-6, A-7-6	0-5	90-100	90-100	80-90	60-90	30-45	11-19
	48-60	Sandy loam, loam, gravelly sandy loam.	SC, SM-SC, CL, CL-ML	A-4, A-2, A-6	0-5	90-100	90-100	60-90	30-70	15-30	3-11
27B, 27C2---------- Miami	0-7	Silt loam-------	CL, CL-ML	A-4, A-6	0	100	95-100	80-100	50-90	22-34	6-15
	7-33	Clay loam, silty clay loam, sandy clay loam.	CL	A-6, A-7	0	92-99	89-97	78-95	64-95	35-50	17-31
	33-60	Loam, clay loam, sandy loam.	CL, CL-ML, ML	A-4, A-6	0-3	88-94	83-89	74-87	50-64	17-30	2-14
36A, 36B, 36C2----- Tama	0-13	Silt loam-------	ML, OL	A-6, A-7	0	100	100	100	95-100	35-50	10-20
	13-49	Silty clay loam	CL	A-7	0	100	100	100	95-100	40-50	15-25
	49-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
41----------------- Muscatine	0-11	Silt loam-------	CL, CL-ML	A-6, A-4	0	100	100	100	95-100	25-40	5-15
	11-41	Silty clay loam	CL	A-7	0	100	100	100	95-100	40-50	20-30
	41-69	Silt loam-------	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
59----------------- Lisbon	0-11	Silt loam-------	ML, CL	A-6, A-7	0	100	100	95-100	80-95	35-50	10-20
	11-36	Silty clay loam	CL, CH	A-7, A-6	0	100	95-100	95-100	80-98	35-55	15-35
	36-60	Loam, clay loam, silt loam.	CL, ML	A-4, A-6, A-7	0-5	90-100	90-100	85-100	70-95	20-45	8-25
61----------------- Atterberry	0-17	Silt loam-------	CL-ML, CL	A-4, A-6	0	100	100	95-100	95-100	25-40	5-15
	17-34	Silty clay loam	CL, CH	A-7	0	100	100	95-100	95-100	40-55	20-30
	34-60	Silt loam-------	CL	A-6, A-4	0	100	100	95-100	95-100	35-40	10-20
62----------------- Herbert	0-9	Silt loam-------	ML, CL	A-6, A-7	0	100	100	95-100	85-100	35-50	11-30
	9-40	Silty clay loam, clay loam.	CL, CH	A-7, A-6	0	95-100	95-100	95-100	85-100	35-55	15-30
	40-60	Loam, silt loam	CL	A-6, A-4	0	95-100	90-100	85-100	60-90	25-40	8-25
68----------------- Sable	0-14	Silty clay loam	CL, OH, CH, OL	A-7	0	100	100	98-100	95-100	41-65	15-35
	14-52	Silty clay loam, silt loam.	CL, CH	A-7	0	100	100	98-100	95-100	40-55	20-35
	52-60	Silt loam-------	CL	A-6	0	100	100	98-100	95-100	30-40	10-20
82----------------- Millington	0-26	Silt loam-------	ML, CL, OL	A-6, A-7, A-4	0	90-100	90-100	80-100	70-95	30-45	8-17
	26-53	Loam, silty clay loam, silt loam.	CL, ML	A-7, A-6	0	95-100	90-100	80-100	70-95	28-50	10-22
	53-60	Stratified loamy sand and silty clay loam. loam.	CL, CL-ML, ML, SM	A-6, A-7, A-4	0	95-100	90-100	80-100	40-95	20-45	3-20

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
93E2---------------- Rodman	0-7	Gravelly loam---	ML, CL, SM, GM	A-4	0-2	70-85	65-85	60-80	36-65	<30	3-9
	7-13	Gravelly loam, sandy loam, loam.	ML, CL-ML, SM-SC, SM	A-4, A-2, A-1	0-2	70-85	60-85	40-75	20-55	<25	NP-5
	13-60	Stratified sand to gravelly sand.	SP, SP-SM, GP, GP-GM	A-1	1-5	30-70	22-55	7-20	2-10	---	NP
100---------------- Palms	0-32	Sapric material	Pt	---	---	---	---	---	---	---	---
	32-60	Clay loam, fine sandy loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	85-100	80-100	70-95	50-90	25-40	5-20
102---------------- La Hogue	0-8	Silt loam-------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-90	20-35	5-15
	8-35	Silty clay loam, sandy clay loam, clay loam.	CL, SC	A-6, A-4	0	100	100	80-100	40-90	25-40	8-20
	35-60	Stratified loamy sand to sand.	SM, SP-SM	A-2, A-3	0	100	100	51-85	5-35	<20	NP
103---------------- Houghton	0-53	Sapric material	Pt	---	0	---	---	---	---	---	---
	53-60	Loamy sand------	SM	A-2	0	100	100	50-75	15-30	<20	NP
104---------------- Virgil	0-15	Silt loam-------	CL	A-4, A-6	0	100	100	90-100	70-95	20-35	8-20
	15-46	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	90-100	30-50	15-30
	46-60	Loam, sandy loam, silt loam.	CL, SC, SM-SC, CL-ML	A-2, A-4, A-6	0-5	90-100	85-100	70-100	30-90	20-35	5-15
107---------------- Sawmill	0-60	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	80-100	30-50	15-30
119B--------------- Elco	0-10	Silt loam-------	CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	25-40	5-15
	10-32	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	95-100	85-100	25-45	11-30
	32-60	Silty clay loam, loam, clay loam.	CL	A-7, A-6	0	100	90-100	80-100	60-95	25-50	11-30
123*. Riverwash											
125---------------- Selma	0-17	Loam, clay loam	SC, CL	A-4, A-6	0	100	98-100	90-100	35-70	25-35	7-17
	17-48	Loam, clay loam, sandy loam.	CL, SC	A-6	0	100	95-100	90-100	38-75	24-36	11-19
	48-60	Stratified sand to silt loam.	CL, SC, SM, ML	A-4, A-6, A-2	0	90-100	85-100	65-100	18-67	<35	NP-21
145B, 145C2-------- Saybrook	0-14	Silt loam-------	CL	A-6, A-7	0	100	100	95-100	90-100	30-50	11-30
	14-28	Silty clay loam	CL, CH	A-7	0	100	95-100	90-100	85-100	40-55	15-25
	28-60	Loam, silt loam, clay loam.	CL	A-6, A-4	0	95-100	85-100	80-95	60-85	20-40	8-25
146---------------- Elliott	0-8	Silt loam-------	CL, ML	A-6, A-7	0	95-100	95-100	95-100	80-99	30-50	10-20
	8-28	Silty clay, silty clay loam.	CH, CL	A-6, A-7	0-5	95-100	95-100	90-100	75-99	30-52	11-26
	28-60	Silty clay loam, clay loam.	CL	A-6, A-7	0-5	95-100	95-100	90-100	70-95	28-45	11-24

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
152---------------- Drummer	0-19	Silty clay loam	CL	A-6, A-7	0	100	95-100	85-100	72-95	30-50	15-30
	19-43	Silty clay loam, silt loam, clay loam.	CL	A-6, A-7	0	100	95-100	85-100	50-80	30-50	15-30
	43-48	Loam, silt loam, clay loam.	CL	A-6, A-7	0-5	95-100	90-100	75-95	50-80	30-50	15-30
	48-60	Stratified sandy loam to silty clay loam.	SC, CL	A-4, A-6	0-5	95-100	85-95	75-95	45-80	20-35	7-20
172---------------- Hoopeston	0-28	Sandy loam------	SM, SC, SM-SC	A-2, A-4	0	90-100	90-100	70-90	25-45	20-35	NP-10
	28-60	Loamy sand, sand, sandy loam.	SP-SM, SM, SC, SM-SC	A-2, A-3	0	90-100	90-100	50-80	5-20	<25	NP-10
188---------------- Beardstown	0-13	Loam------------	CL-ML, CL	A-4, A-6	0	100	100	80-95	50-65	20-30	5-15
	13-34	Clay loam, sandy clay loam, loam.	CL, SC	A-6, A-4	0	100	100	80-90	50-60	25-35	7-15
	34-60	Stratified loamy sand to loam.	SM	A-2, A-4	0	100	100	20-50	15-45	<15	NP-5
197---------------- Troxel	0-31	Silt loam-------	CL, ML	A-6, A-4	0	100	100	95-100	85-95	25-40	5-20
	31-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	95-100	85-95	70-95	30-50	15-30
198---------------- Elburn	0-18	Silt loam-------	CL	A-6	0	100	100	95-100	90-100	25-40	10-25
	18-51	Silty clay loam	CL	A-6, A-7	0	100	100	100	75-90	30-50	15-35
	51-60	Sandy loam, loamy sand, loam.	CL, CL-ML, SC, SM-SC	A-6, A-4, A-2	0	90-100	80-100	60-90	25-80	20-40	5-20
199A, 199B--------- Plano	0-20	Silt loam-------	CL-ML, CL	A-4, A-6	0	100	100	95-100	95-100	20-30	5-15
	20-42	Silty clay loam	CL	A-6	0	100	100	95-100	95-100	25-40	10-25
	42-60	Stratified silt loam to sandy loam.	ML, SM, CL, SC	A-4, A-2	0-5	90-100	80-90	60-90	30-70	<25	NP-10
199C2-------------- Plano	0-8	Silt loam-------	CL-ML, CL	A-4, A-6	0	100	100	95-100	95-100	20-30	5-15
	8-46	Silty clay loam	CL	A-6	0	100	100	95-100	95-100	25-40	10-25
	46-60	Stratified silt loam to sandy loam.	ML, SM, CL, SC	A-4, A-2	0-5	90-100	80-90	60-90	30-70	<25	NP-10
221B--------------- Parr	0-19	Silt loam-------	CL, CL-ML	A-4, A-6	0	100	95-100	80-100	50-90	22-34	6-15
	19-36	Clay loam-------	CL	A-6, A-7	0	90-100	90-95	80-90	65-75	35-50	17-31
	36-71	Loam------------	CL, ML, CL-ML	A-4, A-6	0-3	85-95	80-90	75-85	50-65	17-30	2-14
221C2-------------- Parr	0-8	Silt loam-------	CL, CL-ML	A-4, A-6	0	100	95-100	80-100	50-90	22-34	6-15
	8-25	Clay loam-------	CL	A-6, A-7	0	90-100	90-95	80-90	65-75	35-50	17-31
	25-60	Loam------------	CL, ML, CL-ML	A-4, A-6	0-3	85-95	80-90	75-85	50-65	17-30	2-14
223B--------------- Varna	0-10	Silt loam-------	CL	A-6, A-4	0-5	95-100	95-100	95-100	85-95	25-40	8-20
	10-35	Silty clay, silty clay loam, clay.	CL, CH	A-7, A-6	0-10	95-100	95-100	90-98	80-98	33-56	15-29
	35-60	Silty clay loam, clay loam.	CL	A-7, A-6	0-10	95-100	95-100	90-98	80-95	30-45	13-26

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
227B---------------- Argyle	0-8	Silt loam--------	ML, CL, CL-ML	A-6, A-4	0	100	100	95-100	80-100	25-40	4-15
	8-24	Silty clay loam	CL	A-6	0	100	95-100	90-100	70-95	20-40	11-17
	24-60	Gravelly clay loam, clay loam, gravelly sandy clay loam.	CL, SC, SM, ML	A-4, A-6, A-2	0-5	90-100	80-100	75-90	30-70	20-40	3-15
242---------------- Kendall	0-12	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	20-35	5-15
	12-45	Silty clay loam, silt loam.	CL	A-6	0	100	100	95-100	90-100	25-40	10-20
	45-60	Stratified sandy loam to silt loam.	CL, ML, SM, SC	A-2, A-4	0-5	90-100	80-90	60-90	30-70	8-25	4-10
243A, 243B, 243C2-- St. Charles	0-14	Silt loam--------	CL-ML, CL, ML	A-4, A-6	0	100	100	95-100	95-100	20-35	3-15
	14-46	Silty clay loam, silt loam.	CL	A-6	0	100	100	95-100	90-100	25-40	10-25
	46-60	Stratified silt loam to sandy clay loam.	ML, SC, SM, CL	A-2, A-4 A-6	0-5	90-100	80-90	60-90	30-70	<25	3-15
259B2-------------- Assumption	0-8	Silt loam--------	CL	A-6, A-4	0	100	100	95-100	90-100	25-40	8-20
	8-28	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	90-100	30-50	10-30
	28-60	Clay loam, silty clay loam, loam.	CL, CH	A-6, A-7	0-5	100	95-100	90-100	70-90	35-50	20-35
278---------------- Stronghurst	0-12	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	95-100	95-100	25-35	5-15
	12-41	Silty clay loam	CL	A-7	0	100	100	100	98-100	41-49	19-28
	41-50	Silt loam--------	CL, CL-ML	A-6	0	100	100	98-100	95-100	26-37	5-15
279A--------------- Rozetta	0-10	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	95-100	95-100	24-32	5-15
	10-39	Silty clay loam	CL	A-7	0	100	100	95-100	95-100	41-50	19-28
	39-60	Silt loam--------	CL, ML	A-6, A-4	0	100	100	95-100	95-100	21-37	4-20
280B, 280C2-------- Fayette	0-9	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	9-43	Silty clay loam	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
	43-60	Silt loam--------	CL	A-6	0	100	100	100	95-100	30-40	10-20
290A, 290B, 290C2-- Warsaw	0-12	Loam------------	CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	70-95	25-35	4-12
	12-30	Sandy clay loam, loam, gravelly clay loam.	SC, CL	A-6, A-2-6	0-3	90-95	70-95	60-90	30-70	25-35	10-20
	30-36	Gravelly sandy clay loam, gravelly loam.	CL, SC, GC	A-6, A-2-6	0-5	70-90	60-85	55-70	30-60	25-35	10-15
	36-60	Stratified sand to very gravelly sand.	SP, GP, SP-SM, GP-GM	A-1	1-5	30-70	22-55	7-20	2-10	<20	NP
293---------------- Andres	0-9	Silt loam--------	CL, OL	A-7, A-6	0	95-100	95-100	90-99	80-94	35-50	13-21
	9-50	Silty clay loam, clay loam, sandy clay loam.	CL, CH	A-7	0-5	95-100	95-100	95-100	80-99	40-56	16-32
	50-60	Silty clay loam	CL	A-6, A-7	0-5	95-100	95-100	85-100	70-95	28-48	11-26
297B, 297C2-------- Ringwood	0-11	Silt loam--------	CL	A-4, A-6	0	100	100	95-100	70-90	28-40	8-20
	11-16	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	60-95	30-50	15-35
	16-32	Sandy clay loam, clay loam, loam.	SC, CL	A-6	0	100	90-100	85-95	45-70	25-40	11-25
	32-60	Sandy loam-------	SM, SC, SM-SC	A-2, A-4	0	85-95	60-90	50-80	30-50	<20	NP-10

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
310B, 310C2--------McHenry	0-14	Silt loam-------	CL, CL-ML	A-4, A-6	0	100	95-100	90-100	70-90	20-40	5-15
	14-36	Silty clay loam, clay loam, loam.	CL	A-7, A-6	0	95-100	90-100	80-100	55-90	35-50	20-35
	36-60	Sandy loam, gravelly sandy loam.	SM, SC, SM-SC	A-2, A-4	0-5	85-100	65-90	55-80	20-45	<25	NP-10
327B, 327C2--------Fox	0-8	Loam------------	ML, CL, CL-ML	A-4	0	95-100	85-100	75-95	55-90	20-30	3-10
	8-18	Silty clay loam, silt loam, clay loam.	CL	A-6, A-7	0	85-100	75-100	70-95	55-90	25-45	10-25
	18-28	Clay loam, gravelly loam, gravelly sandy loam.	CL, SC	A-2, A-6, A-7	0	80-100	75-95	50-95	20-65	25-45	10-25
	28-60	Sand and gravel	SP, SM, GP, GM	A-1, A-2, A-3	0-5	40-100	35-100	15-95	2-15	---	NP
329----------------Will	0-14	Loam------------	CL, ML	A-7, A-6	0	95-100	95-100	90-100	60-90	35-50	15-25
	14-28	Loam, sandy clay loam, sandy loam.	CL, SC	A-7, A-6, A-4	0-5	90-100	90-100	80-100	60-90	30-50	8-25
	28-60	Stratified sand to gravelly loamy sand.	GP, GP-GM, SP, SP-SM	A-1	1-10	40-80	40-70	40-50	0-10	---	NP
332A, 332B---------Billett	0-13	Sandy loam------	SM	A-2, A-4	0	100	95-100	85-100	25-50	12-23	NP-5
	13-28	Sandy loam------	SM, SC	A-2, A-4	0	100	95-100	85-100	25-50	<25	NP-15
	28-47	Sandy loam, gravelly sandy loam, loamy sand.	SM, SM-SC	A-2, A-4	0-5	95-100	80-95	75-90	25-45	<25	NP-10
	47-60	Loamy sand, gravelly sand.	GP-GM, GM, SM, SP-SM	A-1, A-2	0-5	25-100	20-100	20-75	5-30	<20	NP-5
343----------------Kane	0-13	Silt loam-------	CL, CL-ML	A-6, A-4	0	95-100	95-100	90-100	75-95	25-35	5-15
	13-31	Silty clay loam, clay loam.	CL, ML	A-6, A-7	0	95-100	95-100	90-100	80-95	35-45	10-20
	31-60	Gravelly loamy sand, sand, gravel.	SP, GP, SP-SM, GP-GM	A-1	0-10	30-70	30-55	10-30	2-12	<5	NP
354A, 354B---------Hononegah	0-19	Loamy coarse sand.	SM, SM-SC	A-2, A-4	0-10	90-100	85-100	60-80	20-45	15-25	NP-6
	19-24	Coarse sand, loamy coarse sand, sandy loam.	SM, SP-SM, SM-SC	A-2, A-1	0-15	80-95	75-95	40-60	10-30	10-20	NP-6
	24-60	Sand, gravel, loamy coarse sand.	SP, GP, GM, SM	A-1	0-15	30-65	20-60	10-35	0-20	---	NP
361B, 361C2, 361D2-Kidder	0-7	Loam------------	ML, CL-ML, CL	A-4	0	95-100	95-100	85-100	60-90	20-30	3-10
	7-23	Clay loam, sandy clay loam, loam.	CL, SC	A-6, A-7	0-5	75-100	75-100	65-95	45-70	25-40	8-15
	23-60	Sandy loam, gravelly sandy loam.	SM	A-2	3-10	50-90	50-90	50-80	15-35	---	NP

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
361D3--------------- Kidder	0-7	Clay loam--------	CL	A-6, A-7	0-5	80-100	80-100	70-95	50-70	25-40	8-15
	7-17	Clay loam, sandy clay loam, loam.	CL, SC	A-6, A-7	0-5	75-100	75-100	65-95	45-70	25-40	8-15
	17-60	Sandy loam, gravelly sandy loam.	SM	A-2	3-10	50-90	50-90	50-80	15-35	---	NP
363B, 363C2, 363D2- Griswold	0-15	Sandy loam-------	SM	A-4	0	95-100	95-100	90-100	35-50	<30	NP-5
	15-26	Loam, sandy loam, clay loam.	CL-ML, CL, SM-SC, SC	A-6, A-4	0-5	95-100	90-100	80-90	45-80	20-35	5-15
	26-36	Gravelly sandy loam.	SM, SC, SM-SC	A-2, A-4	0-10	85-95	65-85	50-75	20-45	<25	3-10
	36-60	Sandy loam-------	SM, SC, SM-SC	A-2, A-4	0-10	85-95	65-85	50-75	20-45	<25	3-10
369---------------- Waupecan	0-15	Silt loam--------	CL	A-4, A-6	0	100	100	90-100	85-95	20-35	8-15
	15-41	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	85-95	35-45	15-25
	41-51	Stratified loam to gravelly loamy sand.	SM, SC, ML, CL	A-2, A-4	0	90-100	65-90	50-70	25-65	<20	NP-10
	51-60	Sand and gravel	GP, SP, SP-SM, GP-GM	A-1	10-35	40-95	30-85	30-50	0-15	---	NP
379A--------------- Dakota	0-13	Silt loam--------	ML, CL, CL-ML	A-4	0	95-100	95-100	80-95	50-65	25-35	5-10
	13-34	Silt loam, silty clay loam, clay loam.	CL	A-4, A-6	0	95-100	85-100	80-95	50-80	30-40	8-15
	34-60	Sand, gravelly coarse sand.	SP, SP-SM	A-1	0	95-100	70-100	30-50	2-5	---	NP
386A, 386B--------- Downs	0-7	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	7-30	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	100	95-100	35-45	15-25
	30-60	Silt loam--------	CL	A-6	0	100	100	100	95-100	30-40	10-20
387A, 387B--------- Ockley	0-13	Silt loam--------	CL, ML, CL-ML	A-4, A-6	0	100	95-100	80-100	60-90	22-33	3-12
	13-32	Silty clay loam, clay loam.	CL	A-6, A-7	0	100	75-100	65-90	50-90	35-50	15-30
	32-54	Gravelly clay loam, sandy clay loam, sandy loam.	CL, SC, GC	A-6, A-7, A-4	0-2	70-85	45-75	40-70	35-55	25-45	8-25
	54-60	Stratified sand to gravelly sand.	SP, SP-SM, GP, GP-GM	A-1	1-5	30-70	20-55	5-20	2-10	---	NP
398A, 398B--------- Wea	0-15	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-90	25-35	5-15
	15-31	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0	95-100	90-95	85-95	65-90	35-50	15-30
	31-58	Gravelly loam, gravelly sandy clay loam, sandy loam.	CL, SM-SC, SC, CL-ML	A-4, A-6	0-5	70-85	65-85	60-80	35-65	15-30	5-15
	58-60	Stratified sand to gravelly sand.	SP, SP-SM, GP, GP-GM	A-1	1-5	30-70	20-55	5-20	0-10	---	NP

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
411B, 411C2-------- Ashdale	0-14	Silt loam-------	ML, CL	A-4, A-6	0	100	100	100	95-100	30-40	8-18
	14-41	Silty clay loam	CL	A-7, A-6	0	100	100	100	95-100	35-50	15-30
	41-45	Silty clay, clay	CH	A-7	0-5	90-100	90-100	90-95	65-90	50-70	30-45
	45	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
412B--------------- Ogle	0-12	Silt loam-------	CL	A-6	0	100	100	95-100	90-100	30-40	10-20
	12-34	Silty clay loam	CL	A-7	0	100	95-100	95-100	90-100	40-50	20-30
	34-60	Clay loam, loam, sandy clay loam.	CL	A-6, A-7	0	95-100	90-100	85-100	60-95	25-50	10-30
415---------------- Orion	0-60	Silt loam-------	CL, CL-ML	A-4, A-6	0	100	100	90-100	80-95	20-30	5-15
419A, 419B, 419C2-- Flagg	0-10	Silt loam-------	ML, CL	A-4, A-6	0	100	100	95-100	90-100	30-40	8-15
	10-37	Silty clay loam	CL	A-6, A-7	0	100	95-100	95-100	90-100	35-50	15-30
	37-60	Clay loam, sandy clay loam, silty clay loam.	CL	A-6	0	95-100	90-100	85-100	60-95	25-40	11-25
429B, 429C2-------- Palsgrove	0-12	Silt loam-------	ML, CL-ML	A-4, A-6	0	100	100	100	95-100	23-35	5-14
	12-50	Silty clay loam	CL	A-7, A-6	0	100	100	100	95-100	36-46	17-27
	50-55	Clay, silty clay	CH	A-7	0-5	90-95	90-95	90-95	65-90	50-70	30-45
	55	Weathered bedrock.	---	---	---	---	---	---	---	---	---
440A, 440B, 440C2-- Jasper	0-9	Silt loam-------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-90	25-35	5-15
	9-34	Loam, clay loam, silty clay loam.	SC, CL	A-6	0	100	100	80-95	45-85	20-35	10-20
	34-39	Fine sandy loam	SC, SM-SC	A-4, A-2-4	0	100	100	60-70	30-40	20-30	5-10
	39-60	Stratified silt to sand.	SC, CL-ML, CL, SM-SC	A-4	0	100	100	75-90	35-85	<30	5-10
451---------------- Lawson	0-27	Silt loam-------	ML, CL, CL-ML	A-4	0	100	100	90-100	80-100	20-30	5-10
	27-60	Silt loam, silty clay loam, loam.	CL-ML, CL	A-4, A-6	0	100	100	85-100	60-100	20-40	5-20
490---------------- Odell	0-13	Silt loam, clay loam.	ML, CL	A-4, A-6	0	100	100	90-100	70-95	30-40	8-14
	13-29	Clay loam, loam, silty clay loam.	CL	A-6, A-7	0	90-100	90-95	80-90	65-75	35-50	17-31
	29-60	Loam, clay loam, sandy loam.	CL, ML, SC, SM	A-4, A-6	0-3	85-95	80-90	65-85	35-65	25-40	2-16
504C, 504E--------- Sogn	0-10	Silt loam-------	CL	A-6, A-7	0-10	85-100	85-100	85-100	80-95	25-45	11-23
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
505C2, 505D2, 505E2-------------- Dunbarton	0-5	Silt loam-------	CL, CL-ML	A-4	0-10	85-100	80-100	80-100	70-90	20-30	5-10
	5-10	Silty clay loam	CL	A-6	0-10	70-100	70-100	70-100	70-95	25-40	11-20
	10-16	Clay, silty clay, silty clay loam.	CH	A-7	0-10	70-100	70-100	70-100	70-95	50-61	24-35
	16-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
506A, 506B, 506C2-- Hitt	0-13	Silt loam-------	CL	A-6, A-4	0	100	100	100	90-100	25-35	8-18
	13-21	Silty clay loam	CL	A-7, A-6	0	100	100	100	90-100	35-50	15-30
	21-44	Clay loam, sandy clay loam.	CL, ML	A-7, A-6	0-5	95-100	90-100	85-100	65-90	35-50	11-25
	44-52	Silty clay, clay	CH, CL	A-7	0-10	90-100	90-100	80-95	60-90	40-60	20-35
	52	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
533*. Urban land											
561B*: Whalan------------	0-10	Silt loam-------	ML	A-4	0	100	95-100	85-95	60-90	30-40	5-10
	10-33	Clay loam, loam	CL	A-6	0	95-100	95-100	80-95	70-90	30-40	10-15
	33-36	Clay loam, clay, silty clay.	CL, CH	A-7	0-5	80-100	70-95	65-90	50-85	40-60	20-35
	36	Weathered bedrock.	---	---	---	---	---	---	---	---	---
NewGlarus---------	0-9	Silt loam-------	CL, CL-ML	A-4	0	100	100	90-100	80-90	20-30	5-10
	9-23	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	90-100	85-95	25-45	11-25
	23-36	Clay------------	CH	A-7	0-10	85-95	85-95	80-95	75-95	50-65	24-45
	36	Weathered bedrock.	---	---	---	---	---	---	---	---	---
561C2*: Whalan------------	0-4	Silt loam-------	ML	A-4	0	100	95-100	85-95	60-90	30-40	5-10
	4-33	Silty clay loam, sandy clay loam	CL, SC	A-6	0	95-100	95-100	80-95	45-90	30-40	10-15
	33-36	Clay loam, clay, silty clay.	CL, CH	A-7	0-5	80-100	70-95	65-90	50-85	40-60	20-35
	36	Weathered bedrock.	---	---	---	---	---	---	---	---	---
NewGlarus---------	0-9	Silt loam-------	CL, CL-ML	A-4	0	100	100	90-100	80-90	20-30	5-10
	9-23	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	90-100	85-95	25-45	11-25
	23-36	Clay------------	CH	A-7	0-10	85-95	85-95	80-95	75-95	50-65	24-45
	36	Weathered bedrock.	---	---	---	---	---	---	---	---	---
561D2*: Whalan------------	0-6	Silt loam-------	ML	A-4	0	100	95-100	85-95	60-90	30-40	5-10
	6-25	Clay loam, loam	CL	A-6	0	95-100	95-100	80-95	70-90	30-40	10-15
	25-28	Clay loam, clay, silty clay.	CL, CH	A-7	0-5	80-100	70-95	65-90	50-85	40-60	20-35
	28	Weathered bedrock.	---	---	---	---	---	---	---	---	---
NewGlarus---------	0-9	Silt loam-------	CL, CL-ML	A-4	0	100	100	90-100	80-90	20-30	5-10
	9-23	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	90-100	85-95	25-45	11-25
	23-36	Clay------------	CH	A-7	0-10	85-95	85-95	80-95	75-95	50-65	24-45
	36	Weathered bedrock.	---	---	---	---	---	---	---	---	---
566B*, 566C2*, 566D2*: Rockton----------	0-10	Loam------------	ML, CL-ML, CL	A-4	0	90-100	90-100	85-95	50-75	25-35	5-10
	10-21	Loam, sandy clay loam, clay loam.	CL, SC	A-6, A-7	0	90-100	90-100	75-90	45-70	30-45	10-20
	21-25	Clay, clay loam, silty clay.	CH, CL	A-7	0-2	90-100	90-100	90-95	70-90	40-60	20-35
	25	Weathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
566B*, 566C2*, 566D2*: Dodgeville-------	0-12	Silt loam-------	CL, CL-ML	A-4	0	100	100	90-100	80-90	20-30	5-10
	12-21	Silt loam, silty clay loam.	CL	A-6, A-7	0	95-100	95-100	90-100	80-100	25-45	11-20
	21-36	Clay, silty clay	CH	A-7	0-10	85-95	85-95	80-95	75-95	50-65	24-35
	36	Weathered bedrock.	---	---	---	---	---	---	---	---	---
570A, 570B, 570C2-- Martinsville	0-12	Silt loam, loam	CL, CL-ML	A-4, A-6	0	100	90-100	80-100	60-90	22-33	4-12
	12-37	Clay loam, silty clay loam, loam.	CL, SC	A-4, A-6	0	100	90-100	65-90	40-90	20-35	8-17
	37-58	Sandy loam, sandy clay loam, loam.	SM, ML	A-2-4, A-4	0	100	90-100	60-80	30-60	30-40	2-8
	58-64	Stratified sand to sandy clay loam.	CL, SC, CL-ML, SM-SC	A-4	0	95-100	85-100	80-95	40-60	<25	4-9
728B, 728C2, 728D2- Winnebago	0-15	Silt loam-------	ML, CL	A-6, A-4	0	100	95-100	95-100	90-100	30-40	5-15
	15-66	Clay loam, sandy clay loam, loam.	SC, CL	A-6, A-2	0-5	70-95	60-90	45-80	30-60	28-40	12-22
	66-74	Sandy loam, loam	CL-ML, SC, SM-SC, CL	A-2, A-6, A-4	0-10	60-80	60-80	35-60	30-55	14-37	4-22
768B, 768C, 768D--- Backbone	0-11	Loamy sand------	SM-SC, SC	A-2, A-4	0	100	100	75-85	15-40	15-25	5-10
	11-17	Sandy loam------	SC, SM-SC	A-2, A-4	0-2	90-95	90-95	65-80	20-40	15-25	5-10
	17-25	Loam------------	CL	A-6	2-5	90-95	90-95	70-80	50-75	35-55	20-30
	25	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
769B, 769C, 769D2-- Edmund	0-12	Silt loam, silty clay loam.	CL	A-6	0-10	70-100	70-100	70-100	70-95	25-40	11-20
	12-15	Silty clay, clay, silty clay loam.	CH	A-7	0-10	70-100	70-100	70-100	70-95	50-61	24-35
	15	Weathered bedrock.	---	---	---	---	---	---	---	---	---
771--------------- Hayfield	0-14	Loam------------	ML, CL	A-6, A-4	0	100	100	90-98	70-90	25-40	3-15
	14-24	Loam, silt loam, clay loam.	ML, CL	A-4, A-6	0	98-100	95-100	70-90	65-80	25-40	3-15
	24-60	Coarse sand, gravelly coarse sand, sand.	SP, SP-SM	A-1	0-3	85-100	50-98	20-45	0-10	---	NP
772--------------- Marshan	0-17	Loam------------	ML, CL	A-6, A-4	0	95-100	95-100	95-100	70-90	30-40	5-15
	17-24	Loam------------	CL	A-7, A-6	0	95-100	75-100	70-90	60-75	30-50	15-25
	24-60	Coarse sand, gravelly coarse sand.	SP, SW, SP-SM	A-1	0-3	65-95	45-95	20-45	2-5	---	NP
776--------------- Comfrey	0-26	Loam, clay loam	OL, OH, MH, ML	A-7	0	100	100	85-98	65-85	45-60	12-20
	26-40	Loam------------	CL	A-7, A-6	0	100	100	80-98	60-85	35-50	12-25
	40-60	Stratified loam to loamy fine sand.	ML, SM	A-7, A-4	0	100	100	80-95	35-70	30-45	5-15
777--------------- Adrian	0-32	Sapric material	PT	A-8	---	---	---	---	---	---	---
	32-60	Sand, loamy sand	SP, SM	A-2, A-3, A-1	0	80-100	60-100	35-75	0-30	---	NP
779B, 779C--------- Chelsea	0-35	Loamy fine sand	SM, SP-SM	A-2-4	0	100	100	65-80	10-35	---	NP
	35-60	Sand, loamy sand, fine sandy loam.	SP, SM, SP-SM	A-3, A-2-4	0	100	100	65-80	3-15	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
780B, 780C2-------- Grellton	0-11	Sandy loam------	SM, ML	A-2, A-4	0	100	100	60-85	30-55	<20	1-4
	11-22	Loam, sandy loam, very fine sandy loam.	SM, ML, SC, CL	A-4, A-6	0	100	100	70-95	40-75	20-30	2-12
	22-36	Silt loam, silty clay loam.	CL	A-6	0	100	100	90-100	75-95	25-40	10-20
	36-60	Sandy loam, loam, silt loam.	SC, CL	A-4	0	95-100	95-100	70-100	40-90	20-30	7-13
781A, 781B--------- Friesland	0-20	Sandy loam------	SM, SM-SC, ML, CL-ML	A-4, A-2	0	100	100	60-85	30-55	<20	NP-5
	20-39	Loam, fine sandy loam, sandy clay loam.	SM, SC, ML, CL	A-4, A-6	0	100	100	70-95	40-75	20-30	2-12
	39-55	Silt loam, silty clay loam.	CL	A-6	0	100	100	90-100	75-100	25-40	10-20
	55-60	Silt loam, loam, sandy loam.	SM, ML	A-4	0-5	85-100	75-100	65-90	40-75	<25	NP-4
782---------------- Juneau	0-9	Silt loam-------	ML, CL, CL-ML	A-4	0	100	100	90-100	80-95	20-30	3-10
	9-33	Silt loam-------	ML, CL, CL-ML	A-4, A-6	0	100	100	90-100	80-95	20-30	3-12
	33-51	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	90-100	80-95	35-50	15-30
	51-69	Clay loam, silt loam, loam.	CL	A-6	0	100	100	90-100	70-95	25-40	10-21
783A, 783B--------- Flagler	0-23	Sandy loam------	SC, SM-SC	A-2, A-4	0	95-100	90-95	60-70	25-40	15-25	5-10
	23-33	Sandy loam------	SC, SM-SC	A-2, A-4	0	95-100	90-95	50-70	25-40	15-25	5-10
	33-60	Loamy sand, gravelly sand.	SP-SM, SW, SP, SW-SM	A-1	0-5	70-90	70-85	20-40	3-12	---	NP
802*. Orthents											
864*, 865*. Pits											
939C2*:											
Rodman------------	0-7	Gravelly loam---	ML, CL, SM, GM	A-4	0-2	70-85	65-85	60-80	36-65	<30	3-9
	7-13	Gravelly loam, sandy loam, loam.	ML, CL-ML, SM-SC, SM	A-4, A-2, A-1	0-2	70-85	60-85	40-75	20-55	<25	NP-5
	13-66	Stratified sand to gravelly sand.	SP, SP-SM, GP, GP-GM	A-1	1-5	30-70	22-55	7-20	2-10	---	NP
Warsaw------------	0-12	Loam------------	CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	70-95	25-35	4-12
	12-30	Sandy clay loam, loam, gravelly clay loam.	SC, CL	A-6, A-2-6	0-3	90-95	70-95	60-90	30-70	25-35	10-20
	30-36	Gravelly sandy clay loam, gravelly loam.	CL, SC, GC	A-6, A-2-6	0-5	70-90	60-85	55-70	30-60	25-35	10-15
	36-60	Stratified sand to very gravelly sand.	SP, GP, SP-SM, GP-GM	A-1	1-5	30-70	22-55	7-20	2-10	<20	NP

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
939D2*:											
Rodman	0-7	Gravelly loam	ML, CL, SM, GM	A-4	0-2	70-85	65-85	60-80	36-65	<30	3-9
	7-13	Gravelly loam, sandy loam, loam.	ML, CL-ML, SM-SC, SM	A-4, A-2, A-1	0-2	70-85	60-85	40-75	20-55	<25	NP-5
	13-60	Stratified sand to gravelly sand.	SP, SP-SM, GP, GP-GM	A-1	1-5	30-70	22-55	7-20	2-10	---	NP
Warsaw	0-12	Loam	CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	70-95	25-35	4-12
	12-30	Sandy clay loam, loam, gravelly clay loam.	SC, CL	A-6, A-2-6	0-3	90-95	70-95	60-90	30-70	25-35	10-20
	30-36	Gravelly sandy clay loam, gravelly loam.	CL, SC, GC	A-6, A-2-6	0-5	70-90	60-85	55-70	30-60	25-35	10-15
	36-60	Stratified sand to very gravelly sand.	SP, GP, SP-SM, GP-GM	A-1	1-5	30-70	22-55	7-20	2-10	<20	NP
2145B*:											
Urban land.											
Saybrook	0-14	Silt loam	CL	A-6, A-7	0	100	100	95-100	90-100	30-50	11-30
	14-28	Silty clay loam	CL, CH	A-7	0	100	95-100	90-100	85-100	40-55	15-25
	28-60	Loam, silt loam, clay loam.	CL	A-6, A-4	0	95-100	85-100	80-95	60-85	20-40	8-25
2354A*:											
Urban land.											
Hononegah	0-19	Loamy coarse sand.	SM, SM-SC	A-2, A-4	0-10	90-100	85-100	60-80	20-45	15-25	NP-6
	19-31	Coarse sand, loamy coarse sand, sandy loam.	SM, SP-SM, SM-SC	A-2, A-1	0-15	80-95	75-95	40-60	10-30	10-20	NP-6
	31-60	Sand, gravel, loamy coarse sand.	SP, GP, GM, SM	A-1	0-15	30-65	20-60	10-35	0-20	---	NP
2363B*, 2363D*:											
Urban land.											
Griswold	0-15	Sandy loam	SM	A-4	0	95-100	95-100	90-100	35-50	<30	NP-5
	15-26	Loam, sandy clay loam, clay loam.	CL-ML, CL, SM-SC, SC	A-6, A-4	0-5	95-100	90-100	80-90	45-80	20-35	5-15
	26-36	Sandy loam	SM, SC, SM-SC	A-2, A-4	0-10	85-95	65-85	50-75	20-45	<25	3-10
	36-60	Sandy loam	SM, SC, SM-SC	A-2, A-4	0-10	85-95	65-85	50-75	20-45	<25	3-10
2386B*:											
Urban land.											
Downs	0-7	Silt loam	CL, CL-ML	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	7-30	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	100	95-100	35-45	15-25
	30-60	Silt loam	CL	A-6	0	100	100	100	95-100	30-40	10-20
2398A*:											
Urban land.											

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
2398A*:											
Wea---------------	0-15	Silt loam-------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-90	25-35	5-15
	15-43	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0	95-100	90-95	85-95	65-90	35-50	15-30
	43-58	Gravelly loam---	CL, SM-SC, SC, CL-ML	A-4, A-6	0-5	70-85	65-85	60-80	35-65	15-30	5-15
	58-60	Stratified sand to gravelly sand.	SP, SP-SM, GP, GP-GM	A-1	1-5	30-70	20-55	5-20	0-10	---	NP
2566B*: Urban land.											
Rockton-----------	0-10	Loam------------	ML, CL-ML, CL	A-4	0	90-100	90-100	85-95	50-75	25-35	5-10
	10-21	Loam, sandy clay loam, clay loam.	CL, SC	A-6, A-7	0	90-100	90-100	75-90	45-70	30-45	10-20
	21-25	Clay, clay loam, silty clay.	CH, CL	A-7	0-2	90-100	90-100	90-95	70-90	40-60	20-35
	25	Weathered bedrock.	---	---	---	---	---	---	---	---	---
2776*: Urban land.											
Comfrey-----------	0-26	Loam------------	OL, OH, MH, ML	A-7	0	100	100	85-98	65-85	45-60	12-20
	26-60	Clay loam, loam	CL	A-7, A-6	0	100	100	80-98	60-85	35-50	12-25
2781B*: Urban land.											
Friesland---------	0-20	Sandy loam------	SM, SM-SC, ML, CL-ML	A-4, A-2	0	100	100	60-85	30-55	<20	NP-5
	20-39	Loam, fine sandy loam, sandy clay loam.	SM, SC, ML, CL	A-4, A-6	0	100	100	70-95	40-75	20-30	2-12
	39-55	Silt loam, silty clay loam.	CL	A-6	0	100	100	90-100	75-100	25-40	10-20
	55-60	Silt loam, loam, sandy loam.	SM, ML	A-4	0-5	85-100	75-100	65-90	40-75	<25	NP-4
2783A*: Urban land.											
Flagler-----------	0-23	Sandy loam------	SC, SM-SC	A-2, A-4	0	95-100	90-95	60-70	25-40	15-25	5-10
	23-33	Sandy loam------	SC, SM-SC	A-2, A-4	0	95-100	90-95	50-70	25-40	15-25	5-10
	33-60	Loamy sand, gravelly sand.	SP-SM, SW, SP, SW-SM	A-1	0-5	70-90	70-85	20-40	3-12	---	NP
4776--------------- Comfrey	0-26	Loam, clay loam	OL, OH, MH, ML	A-7	0	100	100	85-98	65-85	45-60	12-20
	26-40	Clay loam, loam	CL	A-7, A-6	0	100	100	80-98	60-85	35-50	12-25
	40-60	Stratified loam to loamy fine sand.	ML	A-7, A-4	0	100	100	80-95	35-70	30-45	5-15

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T
	In	In/hr	In/in	pH			
21B, 21C2: Pecatonica	0-12	0.6-2.0	0.22-0.24	5.1-6.5	Low	0.37	4-3
	12-24	0.6-2.0	0.17-0.22	5.1-6.5	Low	0.37	
	24-58	0.6-2.0	0.15-0.19	5.1-6.5	Moderate	0.37	
	58-65	0.6-2.0	0.07-0.15	5.6-8.4	Low	0.28	
22B, 22C2: Westville	0-8	0.6-2.0	0.20-0.24	5.1-6.5	Low	0.37	5
	8-60	0.6-2.0	0.15-0.19	5.1-7.3	Moderate	0.37	
22D2: Westville	0-6	0.6-2.0	0.20-0.24	5.1-6.5	Low	0.37	5
	6-48	0.6-2.0	0.15-0.19	5.1-7.3	Moderate	0.37	
	48-60	0.6-2.0	0.07-0.15	6.6-8.4	Low	0.28	
27B, 27C2: Miami	0-7	0.6-2.0	0.20-0.24	5.6-7.3	Low	0.37	5
	7-33	0.6-2.0	0.15-0.20	5.6-6.0	Moderate	0.37	
	33-60	0.6-2.0	0.05-0.19	6.6-8.4	Low	0.37	
36A, 36B, 36C2: Tama	0-13	0.6-2.0	0.22-0.24	5.1-7.3	Moderate	0.32	5
	13-49	0.6-2.0	0.18-0.20	5.1-6.0	Moderate	0.43	
	49-60	0.6-2.0	0.18-0.20	5.6-7.3	Moderate	0.43	
41: Muscatine	0-11	0.6-2.0	0.22-0.24	5.1-7.3	Moderate	0.28	5
	11-41	0.6-2.0	0.18-0.20	5.1-7.3	Moderate	0.43	
	41-69	0.6-2.0	0.18-0.20	6.6-7.8	Moderate	0.43	
59: Lisbon	0-11	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.28	4
	11-36	0.6-2.0	0.18-0.22	6.1-7.8	Moderate	0.43	
	36-60	0.6-2.0	0.07-0.11	6.6-8.4	Low	0.43	
61: Atterberry	0-17	0.6-2.0	0.22-0.24	5.6-6.5	Low	0.32	5
	17-34	0.6-1.0	0.18-0.20	5.1-6.0	Moderate	0.43	
	34-60	0.6-2.0	0.20-0.22	6.1-7.8	Low	0.43	
62: Herbert	0-9	0.6-2.0	0.22-0.24	6.1-7.3	Low	0.32	5
	9-40	0.6-2.0	0.08-0.20	5.6-8.4	Moderate	0.43	
	40-60	0.6-2.0	0.08-0.11	7.4-8.4	Low	0.43	
68: Sable	0-14	0.6-2.0	0.22-0.24	5.6-7.3	Moderate	0.28	5
	14-52	0.6-2.0	0.18-0.20	6.1-7.8	Moderate	0.28	
	52-60	0.6-2.0	0.20-0.22	6.6-7.8	Low	0.28	
82: Millington	0-26	0.6-2.0	0.20-0.24	7.4-8.4	Low	0.28	5
	26-53	0.6-2.0	0.17-0.20	7.4-8.4	Moderate	0.28	
	53-60	0.6-6.0	0.08-0.20	7.4-8.4	Moderate	0.28	
93E2: Rodman	0-7	2.0-6.0	0.10-0.12	6.6-7.8	Low	0.20	3-2
	7-13	2.0-6.0	0.09-0.12	6.6-7.8	Low	0.17	
	13-60	>20	0.02-0.04	7.4-8.4	Low	0.10	
100: Palms	0-32	0.2-6.0	0.35-0.45	5.1-8.4	---	0.10	5
	32-60	0.2-2.0	0.14-0.22	6.1-8.4	Low	0.10	
102: La Hogue	0-8	0.6-2.0	0.20-0.22	6.1-7.3	Low	0.28	5
	8-35	0.6-2.0	0.12-0.19	5.1-7.8	Moderate	0.28	
	35-60	6.0-20	0.05-0.10	5.6-8.4	Low	0.17	
103: Houghton	0-53	0.2-6.0	0.35-0.45	5.6-7.8	---	---	---
	53-60	2.0-6.0	0.08-0.10	6.1-6.5	Low	0.17	
104: Virgil	0-15	0.6-2.0	0.22-0.24	5.1-7.3	Low	0.32	5-4
	15-46	0.2-2.0	0.18-0.20	5.1-6.5	Moderate	0.43	
	46-60	0.6-2.0	0.05-0.11	6.6-8.4	Low	0.28	
107: Sawmill	0-60	0.2-2.0	0.18-0.23	6.1-7.8	Moderate	0.28	5

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
119B------------	0-10	0.6-2.0	0.22-0.24	5.6-7.3	Low------------	0.37	4
Elco	10-32	0.6-2.0	0.18-0.21	5.1-7.3	Moderate-------	0.37	
	32-60	0.2-0.6	0.14-0.20	5.1-7.3	Moderate-------	0.37	
123*. Riverwash							
125--------------	0-17	0.6-2.0	0.17-0.22	6.1-7.8	Moderate-------	0.28	5
Selma	17-48	0.6-2.0	0.15-0.19	6.1-7.8	Moderate-------	0.28	
	48-60	0.6-6.0	0.05-0.22	6.1-7.8	Low------------	0.28	
145B, 145C2------	0-14	0.6-2.0	0.22-0.24	5.6-7.3	Low------------	0.28	5
Saybrook	14-28	0.6-2.0	0.18-0.20	5.6-6.5	Moderate-------	0.43	
	28-60	0.6-2.0	0.15-0.21	6.1-8.4	Low------------	0.43	
146--------------	0-8	0.6-2.0	0.21-0.24	5.6-7.3	Moderate-------	0.28	4
Elliott	8-28	0.2-0.6	0.11-0.20	5.6-7.8	Moderate-------	0.28	
	28-60	0.2-0.6	0.14-0.20	7.4-8.4	Moderate-------	0.28	
152--------------	0-19	0.6-2.0	0.21-0.23	5.6-7.3	Moderate-------	0.28	5
Drummer	19-43	0.6-2.0	0.21-0.24	5.6-7.3	Moderate-------	0.28	
	43-48	0.6-2.0	0.17-0.20	6.1-8.4	Moderate-------	0.28	
	48-60	0.6-2.0	0.11-0.19	6.6-8.4	Low------------	0.28	
172--------------	0-28	2.0-6.0	0.12-0.15	5.1-6.5	Low------------	0.28	4
Hoopeston	28-60	6.0-20.0	0.05-0.10	5.6-7.8	Low------------	0.28	
188--------------	0-13	0.6-2.0	0.17-0.24	5.6-6.5	Low------------	0.32	5
Beardstown	13-34	0.2-2.0	0.15-0.19	4.5-6.0	Low------------	0.32	
	34-60	2.0-6.0	0.08-0.18	5.1-6.0	Low------------	0.17	
197--------------	0-31	0.6-2.0	0.22-0.24	5.6-6.5	Low------------	0.28	5
Troxel	31-60	0.6-2.0	0.15-0.20	5.6-6.5	Moderate-------	0.28	
198--------------	0-18	0.6-2.0	0.22-0.24	5.6-7.8	Low------------	0.28	5-4
Elburn	18-51	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-------	0.43	
	51-60	2.0-6.0	0.08-0.18	6.1-8.4	Low------------	0.43	
199A, 199B-------	0-20	0.6-2.0	0.22-0.24	6.1-7.3	Low------------	0.32	5-4
Plano	20-42	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-------	0.43	
	42-60	0.6-2.0	0.11-0.22	6.6-8.4	Low------------	0.43	
199C2------------	0-8	0.6-2.0	0.22-0.24	6.1-7.3	Low------------	0.32	5-4
Plano	8-46	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-------	0.43	
	46-60	0.6-2.0	0.11-0.22	6.6-8.4	Low------------	0.43	
221B-------------	0-19	0.6-2.0	0.21-0.24	5.6-6.0	Low------------	0.32	5-4
Parr	19-36	0.6-2.0	0.15-0.19	5.6-6.5	Moderate-------	0.32	
	36-71	0.6-2.0	0.05-0.19	7.4-8.4	Low------------	0.32	
221C2------------	0-8	0.6-2.0	0.21-0.24	5.6-6.0	Low------------	0.32	5-4
Parr	8-25	0.6-2.0	0.15-0.19	5.6-6.5	Moderate-------	0.32	
	25-60	0.6-2.0	0.05-0.19	7.4-8.4	Low------------	0.32	
223B-------------	0-10	0.6-2.0	0.22-0.24	6.1-7.3	Low------------	0.32	4-3
Varna	10-35	0.2-0.6	0.09-0.19	5.6-8.4	Moderate-------	0.32	
	35-60	0.06-0.6	0.14-0.20	6.6-8.4	Low------------	0.32	
227B-------------	0-8	0.6-2.0	0.21-0.24	5.1-6.5	Low------------	0.32	4
Argyle	8-24	0.6-2.0	0.18-0.20	5.1-6.0	Moderate-------	0.24	
	24-60	0.6-2.0	0.05-0.18	5.1-6.5	Low------------	0.24	
242--------------	0-12	0.6-2.0	0.22-0.24	6.1-7.3	Low------------	0.37	5
Kendall	12-45	0.6-2.0	0.18-0.20	5.1-6.5	Moderate-------	0.37	
	45-60	0.6-2.0	0.11-0.22	6.6-8.4	Low------------	0.37	

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T
	In	In/hr	In/in	pH			
243A, 243B, 243C2 St. Charles	0-14	0.6-2.0	0.22-0.24	5.1-6.5	Low	0.37	5-4
	14-46	0.6-2.0	0.18-0.20	5.1-7.3	Moderate	0.37	
	46-60	0.6-2.0	0.11-0.22	5.6-7.8	Low	0.37	
259B2 Assumption	0-8	0.6-2.0	0.22-0.24	5.6-6.5	Low	0.32	4-3
	8-28	0.6-2.0	0.18-0.22	5.1-6.5	Moderate	0.43	
	28-60	0.2-0.6	0.14-0.20	5.1-6.5	Moderate	0.43	
278 Stronghurst	0-12	0.6-2.0	0.22-0.24	5.1-7.3	Low	0.37	5-4
	12-41	0.2-2.0	0.18-0.20	5.1-6.0	Moderate	0.37	
	41-50	0.6-2.0	0.20-0.22	5.6-7.3	Low	0.37	
279A Rozetta	0-10	0.6-2.0	0.22-0.24	5.1-6.0	Low	0.37	5
	10-39	0.6-2.0	0.18-0.20	5.1-6.0	Moderate	0.37	
	39-60	0.6-2.0	0.20-0.22	5.6-7.8	Low	0.37	
280B, 280C2 Fayette	0-9	0.6-2.0	0.20-0.22	5.1-7.3	Low	0.37	5
	9-43	0.6-2.0	0.18-0.20	4.5-6.0	Moderate	0.37	
	43-60	0.6-2.0	0.18-0.20	5.1-7.8	Moderate	0.37	
290A, 290B, 290C2 Warsaw	0-12	0.6-2.0	0.20-0.24	5.6-7.3	Low	0.28	4-3
	12-30	0.6-2.0	0.16-0.19	5.1-7.8	Low	0.28	
	30-36	0.6-2.0	0.15-0.17	6.6-8.4	Low	0.28	
	36-60	>20	0.02-0.04	7.9-8.4	Low	0.10	
293 Andres	0-9	0.6-2.0	0.21-0.24	6.1-7.3	Low	0.28	5
	9-50	0.6-2.0	0.16-0.20	6.1-7.8	Moderate	0.28	
	50-60	0.2-0.6	0.18-0.20	7.9-8.4	Moderate	0.37	
297B, 297C2 Ringwood	0-11	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.28	5
	11-16	0.6-2.0	0.18-0.20	5.6-7.3	Moderate	0.43	
	16-32	0.6-2.0	0.15-0.19	6.1-8.4	Moderate	0.32	
	32-60	2.0-6.0	0.10-0.13	7.4-8.4	Low	0.32	
310B, 310C2 McHenry	0-14	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.37	5-4
	14-36	0.6-2.0	0.15-0.22	5.1-7.3	Moderate	0.37	
	36-60	0.6-2.0	0.12-0.19	5.1-7.8	Moderate	0.37	
	34-60	2.0-6.0	0.08-0.16	7.4-8.4	Low	0.28	
327B, 327C2 Fox	0-8	0.6-2.0	0.20-0.24	5.1-7.3	Low	0.32	4
	8-18	0.6-2.0	0.15-0.22	5.1-7.3	Moderate	0.32	
	18-28	0.6-2.0	0.15-0.19	5.6-7.8	Moderate	0.32	
	28-60	>6.0	0.02-0.04	7.9-8.4	Low	0.10	
329 Will	0-14	0.6-2.0	0.15-0.20	6.1-8.4	Moderate	0.28	4
	14-28	0.6-2.0	0.13-0.20	6.1-7.3	Moderate	0.28	
	28-60	6.0-20	0.02-0.04	7.9-8.4	Low	0.10	
332A, 332B Billett	0-13	2.0-6.0	0.13-0.17	5.1-6.0	Low	0.20	5
	13-28	2.0-6.0	0.12-0.14	5.6-7.3	Low	0.20	
	28-47	2.0-6.0	0.12-0.14	5.6-7.3	Low	0.20	
	47-60	6.0-20	0.02-0.08	5.1-7.8	Low	0.10	
343 Kane	0-13	0.6-2.0	0.20-0.24	5.6-7.3	Low	0.28	4
	13-31	0.6-2.0	0.15-0.20	5.6-7.3	Moderate	0.28	
	31-60	6.0-20	0.02-0.04	7.9-8.4	Very low	0.10	
354A, 354B Hononegah	0-19	>20	0.04-0.06	5.6-7.8	Low	0.17	4
	19-24	>20	0.03-0.05	5.6-7.8	Low	0.17	
	24-60	>20	0.02-0.03	7.9-8.4	Low	0.10	
361B, 361C2, 361D2 Kidder	0-7	0.6-2.0	0.20-0.24	6.1-7.8	Low	0.32	5
	7-23	0.6-2.0	0.15-0.19	5.6-7.8	Moderate	0.32	
	23-60	2.0-6.0	0.09-0.11	7.4-8.4	Low	0.32	

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
361D3------------ Kidder	0-7	0.6-2.0	0.17-0.19	6.1-7.8	Moderate-------	0.32	4
	7-17	0.6-2.0	0.15-0.19	5.6-7.8	Moderate-------	0.32	
	17-60	2.0-6.0	0.09-0.11	7.4-8.4	Low------------	0.32	
363B, 363C2, 363D2----------- Griswold	0-15	0.6-2.0	0.13-0.15	6.1-7.3	Low------------	0.20	5
	15-26	0.6-2.0	0.14-0.19	6.1-7.3	Low------------	0.32	
	26-36	0.6-2.0	0.11-0.13	6.6-7.3	Low------------	0.32	
	36-60	0.6-2.0	0.11-0.13	7.4-8.4	Low------------	0.32	
369-------------- Waupecan	0-15	0.6-2.0	0.22-0.24	5.1-6.5	Low------------	0.32	4
	15-41	0.6-2.0	0.18-0.22	5.6-6.5	Moderate-------	0.43	
	41-51	2.0-6.0	0.08-0.18	6.1-7.8	Low------------	0.10	
	51-60	>20.0	0.02-0.04	7.9-8.4	Low------------	0.10	
379A------------- Dakota	0-13	0.6-2.0	0.20-0.22	5.6-7.3	Low------------	0.28	4
	13-34	0.6-2.0	0.17-0.19	5.1-7.3	Low------------	0.28	
	34-60	6.0-20	0.02-0.04	5.1-7.3	Low------------	0.17	
386A, 386B------- Downs	0-7	0.6-2.0	0.21-0.23	5.1-7.3	Low------------	0.32	5-4
	7-30	0.6-2.0	0.18-0.20	4.5-6.0	Moderate-------	0.43	
	30-60	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-------	0.43	
387A, 387B------- Ockley	0-13	0.6-2.0	0.20-0.24	5.6-6.5	Low------------	0.37	5
	13-32	0.6-2.0	0.15-0.20	4.5-6.0	Moderate-------	0.37	
	32-54	0.6-6.0	0.12-0.14	5.6-6.5	Moderate-------	0.24	
	54-60	>20	0.02-0.04	7.4-8.4	Low------------	0.10	
398A, 398B------- Wea	0-15	0.6-2.0	0.20-0.24	5.1-6.5	Low------------	0.32	5-4
	15-31	0.6-2.0	0.15-0.20	5.1-6.5	Moderate-------	0.43	
	31-58	0.6-2.0	0.10-0.12	6.1-8.4	Low------------	0.24	
	58-60	>20	0.02-0.04	7.4-8.4	Low------------	0.10	
411B, 411C2------ Ashdale	0-14	0.6-2.0	0.22-0.24	6.1-7.3	Low------------	0.32	4
	14-41	0.6-2.0	0.18-0.20	5.1-6.0	Moderate-------	0.43	
	41-45	0.06-0.2	0.09-0.13	5.6-7.3	High-----------	0.32	
	45	---	---	---	---------------	---	
412B------------- Ogle	0-12	0.6-2.0	0.22-0.24	5.1-6.5	Low------------	0.28	5-4
	12-34	0.6-2.0	0.18-0.20	5.1-6.0	Moderate-------	0.43	
	34-60	0.6-2.0	0.07-0.10	5.6-6.0	Moderate-------	0.43	
415-------------- Orion	0-60	0.6-2.0	0.22-0.24	5.6-7.8	Low------------	0.37	5
419A, 419B, 419C2----------- Flagg	0-10	0.6-2.0	0.22-0.24	4.5-7.3	Low------------	0.37	5-4
	10-37	0.6-2.0	0.14-0.20	4.5-6.0	Moderate-------	0.37	
	37-60	0.6-2.0	0.07-0.10	5.1-6.0	Low------------	0.37	
429B, 429C2------ Palsgrove	0-12	0.6-2.0	0.22-0.24	5.6-7.3	Moderate-------	0.32	4-3
	12-50	0.6-2.0	0.18-0.20	5.1-6.0	Moderate-------	0.43	
	50-55	<0.06	0.08-0.10	5.6-7.3	High-----------	0.32	
	55	---	---	---	---------------	---	
440A, 440B, 440C2----------- Jasper	0-9	0.6-2.0	0.20-0.24	5.1-6.5	Low------------	0.28	5
	9-34	0.6-2.0	0.16-0.18	5.1-6.0	Low------------	0.28	
	34-39	0.6-2.0	0.14-0.16	5.6-7.3	Low------------	0.28	
	39-60	0.6-2.0	0.19-0.21	7.4-7.8	Low------------	0.28	
451-------------- Lawson	0-27	0.6-2.0	0.22-0.24	6.1-7.8	Low------------	0.28	5
	27-60	0.6-2.0	0.20-0.22	6.1-7.8	Low------------	0.28	
490-------------- Odell	0-13	0.6-2.0	0.21-0.24	5.6-7.3	Low------------	0.32	5-4
	13-29	0.2-0.6	0.15-0.19	5.6-6.5	Moderate-------	0.32	
	29-60	0.2-2.0	0.05-0.19	6.6-8.4	Low------------	0.32	

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T
	In	In/hr	In/in	pH			
504C, 504E: Sogn	0-10	0.6-2.0	0.17-0.22	6.1-8.4	Moderate	0.28	1
	10	---	---	---	---	---	
505C2, 505D2, 505E2: Dunbarton	0-5	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.37	2
	5-10	0.6-2.0	0.18-0.20	6.6-7.8	Moderate	0.37	
	10-16	0.2-2.0	0.09-0.13	6.6-7.8	High	0.37	
	16-60	---	---	---	---	---	
506A, 506B, 506C2: Hitt	0-13	0.6-2.0	0.22-0.24	5.1-6.5	Low	0.32	5
	13-21	0.6-2.0	0.18-0.20	5.1-6.0	Moderate	0.32	
	21-44	0.6-2.0	0.15-0.19	5.1-6.0	Moderate	0.32	
	44-52	0.06-0.2	0.08-0.12	5.6-7.3	Moderate	0.32	
	52	---	---	---	---	---	
533*. Urban land							
561B*: Whalan	0-10	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.32	4
	10-33	0.6-2.0	0.17-0.19	5.1-6.5	Low	0.32	
	33-36	0.06-0.6	0.15-0.19	5.6-7.8	High	0.32	
	36	---	---	---	---	---	
NewGlarus	0-9	0.6-2.0	0.22-0.24	5.1-7.3	Low	0.37	4
	9-23	0.2-2.0	0.18-0.22	5.1-7.3	Moderate	0.37	
	23-36	0.2-0.6	0.09-0.13	5.1-6.5	High	0.37	
	36	---	---	---	---	---	
561C2*: Whalan	0-4	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.32	4
	4-33	0.6-2.0	0.17-0.19	5.1-6.5	Low	0.32	
	33-36	0.06-0.6	0.15-0.19	5.6-7.8	High	0.32	
	36	---	---	---	---	---	
NewGlarus	0-9	0.6-2.0	0.22-0.24	5.1-7.3	Low	0.37	4
	9-23	0.2-2.0	0.18-0.22	5.1-7.3	Moderate	0.37	
	23-36	0.2-0.6	0.09-0.13	5.1-6.5	High	0.37	
	36	---	---	---	---	---	
561D2*: Whalan	0-6	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.32	4
	6-25	0.6-2.0	0.17-0.19	5.1-6.5	Low	0.32	
	25-28	0.06-0.6	0.15-0.19	5.6-7.8	High	0.32	
	28	---	---	---	---	---	
NewGlarus	0-9	0.6-2.0	0.22-0.24	5.1-7.3	Low	0.37	4
	9-23	0.2-2.0	0.18-0.22	5.1-7.3	Moderate	0.37	
	23-36	0.2-0.6	0.09-0.13	5.1-6.5	High	0.37	
	36	---	---	---	---	---	
566B*, 566C2*, 566D2*: Rockton	0-10	0.6-2.0	0.20-0.22	5.1-6.5	Low	0.28	4
	10-21	0.6-2.0	0.17-0.19	5.1-6.5	Moderate	0.28	
	21-25	0.6-2.0	0.10-0.14	5.6-7.3	High	0.28	
	25	---	---	---	---	---	
Dodgeville	0-12	0.6-2.0	0.22-0.24	5.1-7.3	Low	0.32	4
	12-21	0.2-2.0	0.18-0.22	5.1-7.3	Moderate	0.43	
	21-36	0.2-0.6	0.09-0.13	5.1-6.5	High	0.43	
	36	---	---	---	---	---	

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
570A, 570B, 570C2----------- Martinsville	0-12	0.6-2.0	0.20-0.24	5.6-7.3	Low------------	0.37	5
	12-37	0.6-2.0	0.17-0.20	5.1-6.0	Moderate-------	0.37	
	37-58	0.6-2.0	0.12-0.14	5.6-6.5	Low------------	0.24	
	58-64	0.6-2.0	0.19-0.21	7.4-8.4	Low------------	0.24	
728B, 728C2, 728D2----------- Winnebago	0-15	0.6-2.0	0.15-0.22	5.1-6.5	Low------------	0.32	5
	15-66	0.6-2.0	0.15-0.19	5.1-6.0	Moderate-------	0.32	
	66-74	0.6-2.0	0.11-0.18	5.6-7.8	Low------------	0.32	
768B, 768C, 768D- Backbone	0-11	2.0-6.0	0.12-0.14	6.6-7.3	Low------------	0.24	4
	11-17	2.0-6.0	0.11-0.13	5.1-7.3	Low------------	0.24	
	17-25	0.6-2.0	0.17-0.19	5.6-7.3	Moderate-------	0.24	
	25	---	---	---	---------------	---	
769B, 769C, 769D2----------- Edmund	0-12	0.6-2.0	0.21-0.23	5.6-6.5	Moderate-------	0.37	1
	12-15	0.2-0.6	0.09-0.13	6.6-7.8	High-----------	0.37	
	15	---	---	---	---------------	---	
771-------------- Hayfield	0-14	0.6-2.0	0.20-0.24	5.6-6.5	Low------------	0.32	5
	14-24	0.6-2.0	0.17-0.22	5.1-6.0	Low------------	0.32	
	24-60	6.0-20	0.02-0.04	5.6-7.8	Low------------	0.15	
772-------------- Marshan	0-17	0.6-2.0	0.20-0.24	5.6-7.3	Low------------	0.28	4
	17-24	0.6-2.0	0.15-0.19	5.6-7.3	Low------------	0.28	
	24-60	6.0-20	0.02-0.05	6.1-7.3	Low------------	0.15	
776-------------- Comfrey	0-26	0.6-2.0	0.18-0.22	6.6-7.8	Moderate-------	0.28	5
	26-40	0.6-2.0	0.15-0.19	6.3-8.4	Moderate-------	0.28	
	40-60	0.6-6.0	0.10-0.19	6.3-8.4	Low------------	0.24	
777-------------- Adrian	0-32	0.2-6.0	0.35-0.45	5.1-7.8	---------------	---	---
	32-60	6.0-20	0.03-0.08	6.1-8.4	Low------------	---	
779B, 779C------- Chelsea	0-35	6.0-20	0.10-0.15	5.6-7.3	Low------------	0.17	5
	35-60	6.0-20	0.06-0.08	5.1-5.5	Low------------	0.17	
780B, 780C2------ Grellton	0-11	0.6-2.0	0.13-0.18	5.6-7.3	Low------------	0.24	5
	11-22	0.6-2.0	0.12-0.19	5.1-6.5	Moderate-------	0.32	
	22-36	0.6-2.0	0.18-0.22	5.1-7.3	Moderate-------	0.32	
	36-60	0.6-2.0	0.15-0.22	5.6-7.3	Moderate-------	0.32	
781A, 781B------- Friesland	0-20	0.6-2.0	0.13-0.18	5.6-6.5	Low------------	0.20	5-4
	20-39	0.6-2.0	0.12-0.19	5.6-6.5	Low------------	0.32	
	39-55	0.6-2.0	0.18-0.22	5.6-6.5	Moderate-------	0.43	
	55-60	0.6-2.0	0.08-0.22	6.1-8.4	Low------------	0.43	
782-------------- Juneau	0-9	0.6-2.0	0.22-0.24	5.6-7.8	Low------------	0.37	5
	9-33	0.6-2.0	0.20-0.22	5.6-7.8	Low------------	0.37	
	33-51	0.6-2.0	0.18-0.22	5.6-7.8	Moderate-------	0.37	
	51-60	0.6-2.0	0.14-0.16	5.6-7.8	Moderate-------	0.37	
783A, 783B------- Flagler	0-23	2.0-6.0	0.12-0.14	6.1-7.3	Low------------	0.20	4
	23-33	2.0-6.0	0.11-0.13	5.1-6.5	Low------------	0.20	
	33-60	>20	0.02-0.04	5.1-7.3	Low------------	0.20	
802*. Orthents							
864*, 865*. Pits							
939C2*: Rodman----------	0-7	2.0-6.0	0.10-0.12	6.6-7.8	Low------------	0.20	3-2
	7-13	2.0-6.0	0.09-0.12	6.6-7.8	Low------------	0.17	
	13-66	>20	0.02-0.04	7.4-8.4	Low------------	0.10	

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
939C2*:							
Warsaw----------	0-12	0.6-2.0	0.20-0.24	5.6-7.3	Low------------	0.28	4-3
	12-30	0.6-2.0	0.16-0.19	5.1-7.8	Low------------	0.28	
	30-36	0.6-2.0	0.15-0.17	6.6-8.4	Low------------	0.28	
	36-60	>20	0.02-0.04	7.9-8.4	Low------------	0.10	
939D2*:							
Rodman----------	0-7	2.0-6.0	0.10-0.12	6.6-7.8	Low------------	0.20	3-2
	7-13	2.0-6.0	0.09-0.12	6.6-7.8	Low------------	0.17	
	13-60	>20	0.02-0.04	7.4-8.4	Low------------	0.10	
Warsaw----------	0-12	0.6-2.0	0.20-0.24	5.6-7.3	Low------------	0.28	4-3
	12-30	0.6-2.0	0.16-0.19	5.1-7.8	Low------------	0.28	
	30-36	0.6-2.0	0.15-0.17	6.6-8.4	Low------------	0.28	
	36-60	>20	0.02-0.04	7.9-8.4	Low------------	0.10	
2145B*:							
Urban land.							
Saybrook--------	0-14	0.6-2.0	0.22-0.24	5.6-7.3	Low------------	0.28	5
	14-28	0.6-2.0	0.18-0.20	5.6-6.5	Moderate-------	0.43	
	28-60	0.6-2.0	0.15-0.21	6.1-8.4	Low------------	0.43	
2354A*:							
Urban land.							
Hononegah-------	0-19	>20	0.04-0.06	5.6-7.8	Low------------	0.17	4
	19-31	>20	0.03-0.05	5.6-7.8	Low------------	0.17	
	31-60	>20	0.02-0.03	7.9-8.4	Low------------	0.10	
2363B*, 2363D*:							
Urban land.							
Griswold--------	0-15	0.6-2.0	0.13-0.15	6.1-7.3	Low------------	0.20	5
	15-26	0.6-2.0	0.14-0.19	6.1-7.3	Low------------	0.32	
	26-36	0.6-2.0	0.11-0.13	6.6-7.3	Low------------	0.32	
	36-60	0.6-2.0	0.11-0.13	7.4-8.4	Low------------	0.32	
2386B*:							
Urban land.							
Downs-----------	0-7	0.6-2.0	0.21-0.23	5.1-7.3	Low------------	0.32	5-4
	7-30	0.6-2.0	0.18-0.20	4.5-6.0	Moderate-------	0.43	
	30-60	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-------	0.43	
2398A*:							
Urban land.							
Wea-------------	0-15	0.6-2.0	0.20-0.24	5.1-6.5	Low------------	0.32	5-4
	15-43	0.6-2.0	0.15-0.20	5.1-6.5	Moderate-------	0.43	
	43-58	0.6-2.0	0.10-0.12	6.1-8.4	Low------------	0.24	
	58-60	>20	0.02-0.04	7.4-8.4	Low------------	0.10	
2566B*:							
Urban land.							
Rockton---------	0-10	0.6-2.0	0.20-0.22	5.1-6.5	Low------------	0.28	4
	10-21	0.6-2.0	0.17-0.19	5.1-6.5	Moderate-------	0.28	
	21-25	0.6-2.0	0.10-0.14	5.6-7.3	High-----------	0.28	
	25	---	---	---	---------------	---	
2776*:							
Urban land.							
Comfrey---------	0-26	0.6-2.0	0.18-0.22	6.6-7.8	Moderate-------	0.28	5
	26-60	0.6-2.0	0.15-0.19	6.3-8.4	Moderate-------	0.28	

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
2781B*:							
Urban land.							
Friesland-------	0-20	0.6-2.0	0.13-0.18	5.6-6.5	Low------------	0.20	5-4
	20-39	0.6-2.0	0.12-0.19	5.6-6.5	Low------------	0.32	
	39-55	0.6-2.0	0.18-0.22	5.6-6.5	Moderate-------	0.43	
	55-60	0.6-2.0	0.08-0.22	6.1-8.4	Low------------	0.43	
2783A*:							
Urban land.							
Flagler---------	0-23	2.0-6.0	0.12-0.14	6.1-7.3	Low------------	0.20	4
	23-33	2.0-6.0	0.11-0.13	5.1-6.5	Low------------	0.20	
	33-60	>20	0.02-0.04	5.1-7.3	Low------------	0.20	
4776-------------	0-26	0.6-2.0	0.18-0.22	6.6-7.8	Moderate-------	0.28	5
Comfrey	26-40	0.6-2.0	0.15-0.19	6.3-8.4	Moderate-------	0.28	
	40-60	0.6-6.0	0.10-0.19	6.3-8.4	Low------------	0.24	

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
21B, 21C2--------- Pecatonica	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
22B, 22C2, 22D2--- Westville	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
27B, 27C2--------- Miami	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
36A, 36B, 36C2---- Tama	B	None---------	---	---	>6.0	---	---	>60	---	High-----	Moderate	Moderate.
41---------------- Muscatine	B	None---------	---	---	1.0-3.0	Apparent	Nov-Jul	>60	---	High-----	High-----	Moderate.
59---------------- Lisbon	B	None---------	---	---	1.0-3.0	Apparent	Nov-May	>60	---	High-----	High-----	Moderate.
61---------------- Atterberry	B	None---------	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
62---------------- Herbert	B	None---------	---	---	1.0-3.0	Apparent	Mar-May	>60	---	High-----	High-----	Moderate.
68---------------- Sable	B/D	Occasional	Brief-----	Mar-Jun	0-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.
82---------------- Millington	B	Frequent----	Brief-----	Apr-Jun	0-2.0	Apparent	Mar-Jul	>60	---	High-----	High-----	Low.
93E2-------------- Rodman	A	None---------	---	---	>6.0	---	---	>60	---	Low------	Low------	Low.
100--------------- Palms	A/D	Frequent----	Long------	Nov-May	0-1.0	Apparent	Nov-May	>60	---	High-----	High-----	Moderate.
102--------------- La Hogue	B	None---------	---	---	1.0-3.0	Apparent	Feb-Jun	>60	---	High-----	High-----	Moderate.
103--------------- Houghton	A/D	Frequent----	Long------	Nov-May	0-1.0	Apparent	Sep-Jun	>60	---	High-----	High-----	Low.
104--------------- Virgil	B	None---------	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
107--------------- Sawmill	B/D	Frequent----	Brief-----	Mar-Jun	0-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.
119B-------------- Elco	B	None---------	---	---	>2.5	Apparent	Mar-May	>60	---	High-----	High-----	Moderate.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
123*. Riverwash												
125--------------- Selma	B/D	Occasional	Brief-----	Apr-Jun	0-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.
145B, 145C2------- Saybrook	B	None---------	---	---	>6.0	---	---	>60	---	High-----	High-----	Moderate.
146--------------- Elliott	C	None---------	---	---	1.0-3.0	Perched	Mar-May	>60	---	High-----	High-----	Moderate.
152--------------- Drummer	B/D	Occasional	Brief-----	Mar-Jun	0-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
172--------------- Hoopeston	B	None---------	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High-----	Low------	Moderate.
188--------------- Beardstown	C	None---------	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High-----	High-----	High.
197--------------- Troxel	B	Occasional	Very brief	Mar-Jun	>6.0	---	---	>60	---	High-----	Low------	Moderate.
198--------------- Elburn	B	None---------	---	---	1.0-3.0	Apparent	Jan-May	>60	---	High-----	High-----	Moderate.
199A, 199B, 199C2- Plano	B	None---------	---	---	>6.0	---	---	>60	---	High-----	Moderate	Low.
221B, 221C2------- Parr	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
223B-------------- Varna	C	None---------	---	---	3.0-6.0	Perched	Mar-May	>60	---	High-----	Moderate	Moderate.
227B-------------- Argyle	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Moderate.
242--------------- Kendall	B	None---------	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
243A, 243B, 243C2- St. Charles	B	None---------	---	---	>6.0	---	---	>60	---	High-----	Moderate	Moderate.
259B2------------- Assumption	B	None---------	---	---	3.0-4.5	Perched	Feb-May	>60	---	High-----	High-----	Moderate.
278--------------- Stronghurst	B	None---------	---	---	1.0-3.0	Apparent	Apr-Jun	>60	---	High-----	High-----	Moderate.
279A-------------- Rozetta	B	None---------	---	---	3.0-4.0	Apparent	Apr-Jun	>60	---	High-----	Moderate	Moderate.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
280B, 280C2-------- Fayette	B	None---------	---	---	>6.0	---	---	>60	---	High-----	Moderate	Moderate.
290A, 290B, 290C2- Warsaw	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low-------	Moderate.
293---------------- Andres	B	None---------	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.
297B, 297C2-------- Ringwood	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
310B, 310C2-------- McHenry	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	High-----	Moderate.
327B, 327C2-------- Fox	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Moderate.
329---------------- Will	B/D	Occasional	Brief-----	Apr-Jun	0-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
332A, 332B--------- Billett	A	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Moderate.
343---------------- Kane	B	None---------	---	---	1.0-3.0	Apparent	Feb-Jun	>60	---	High-----	High-----	Moderate.
354A, 354B--------- Hononegah	A	None---------	---	---	>6.0	---	---	>60	---	Low------	Low------	Low.
361B, 361C2, 361D2, 361D3----- Kidder	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
363B, 363C2, 363D2------------ Griswold	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Low.
369---------------- Waupecan	B	None---------	---	---	>6.0	---	---	>60	---	High-----	Moderate	Moderate.
379A--------------- Dakota	B	None---------	---	---	>6.0	---	---	>60	---	Low------	Low------	Moderate.
386A, 386B--------- Downs	B	None---------	---	---	>6.0	---	---	>60	---	High-----	Moderate	Moderate.
387A, 387B--------- Ockley	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
398A, 398B--------- Wea	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro- logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
411B, 411C2------- Ashdale	B	None--------	---	---	>6.0	---	---	40-60	Hard	High-----	Moderate	Moderate.
412B-------------- Ogle	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate	Moderate.
415--------------- Orion	C	Frequent----	Brief-----	Mar-Nov	1.0-3.0	Apparent	Nov-May	>60	---	High-----	High-----	Low.
419A, 419B, 419C2- Flagg	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate	Moderate.
429B, 429C2------- Palsgrove	B	None--------	---	---	>6.0	---	---	40-60	Hard	High-----	High-----	Moderate.
440A, 440B, 440C2- Jasper	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	High.
451--------------- Lawson	B	Occasional	Brief-----	Mar-Nov	1.0-3.0	Apparent	Nov-May	>60	---	High-----	Moderate	Low.
490--------------- Odell	B	None--------	---	---	1.0-3.0	Apparent	Jan-Apr	>60	---	High-----	High-----	Moderate.
504C, 504E-------- Sogn	D	None--------	---	---	>6.0	---	---	4-20	Hard	Moderate	Low------	Low.
505C2, 505D2, 505E2------------ Dunbarton	C	None--------	---	---	>6.0	---	---	12-20	Rippable	Moderate	Moderate	Low.
506A, 506B, 506C2- Hitt	B	None--------	---	---	>6.0	---	---	40-60	Hard	Moderate	Moderate	Moderate.
533*. Urban land												
561B*, 561C2*, 561D2*:												
Whalan-----------	B	None--------	---	---	>6.0	---	---	20-40	Rippable	Moderate	Moderate	Low.
NewGlarus--------	B	None--------	---	---	>6.0	---	---	20-40	Rippable	High-----	Moderate	Moderate.
566B*, 566C2*, 566D2*:												
Rockton----------	B	None--------	---	---	>6.0	---	---	20-40	Rippable	Moderate	Low------	Low.
Dodgeville-------	B	None--------	---	---	>6.0	---	---	20-40	Rippable	High-----	Moderate	Moderate.
570A, 570B, 570C2- Martinsville	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
728B, 728C2, 728D2: Winnebago	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
768B, 768C, 768D: Backbone	B	None	---	---	>6.0	---	---	20-40	Hard	Moderate	Low	Low.
769B, 769C, 769D2: Edmund	C	None	---	---	>6.0	---	---	12-20	Rippable	Moderate	Moderate	Low.
771: Hayfield	B	None	---	---	2.0-3.0	Apparent	Apr-Jun	>60	---	High	Low	Moderate.
772: Marshan	B/D	None to common.	Very brief	Mar-Nov	0-1.0	Apparent	Jan-Dec	>60	---	High	High	Moderate.
776: Comfrey	B/D	Common	Brief to long.	Apr-Jul	0-1.0	Apparent	Apr-Jul	>60	---	High	High	Low.
777: Adrian	A/D	Frequent	Long	Nov-May	0-1.0	Apparent	Nov-May	>60	---	High	High	Moderate.
779B, 779C: Chelsea	A	None	---	---	>6.0	---	---	>60	---	Low	Low	Low.
780B, 780C2: Grellton	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
781A, 781B: Friesland	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
782: Juneau	B	Occasional	Brief	Nov-May	>2.5	Apparent	Nov-May	>60	---	High	High	Moderate.
783A, 783B: Flagler	B	None to rare	---	---	>6.0	---	---	>60	---	Low	Moderate	Low.
802*. Orthents												
864*, 865*. Pits												
939C2*, 939D2*:												
Rodman	A	None	---	---	>6.0	---	---	>60	---	Low	Low	Low.
Warsaw	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	Moderate.
2145B*: Urban land.												
Saybrook	B	None	---	---	4.0-6.0	Apparent	Mar-Jun	>60	---	High	High	Moderate.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
2354A*: Urban land.												
Hononegah--------	A	None--------	---	---	>6.0	---	---	>60	---	Low------	Low------	Low.
2363B*, 2363D*: Urban land.												
Griswold---------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Low.
2386B*: Urban land.												
Downs------------	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate	Moderate.
2398A*: Urban land.												
Wea--------------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
2566B*: Urban land.												
Rockton----------	B	None--------	---	---	>6.0	---	---	20-40	Rippable	Moderate	Low------	Low.
2776*: Urban land.												
Comfrey----------	B/D	Common------	Brief to long.	Apr-Jul	0-1.0	Apparent	Apr-Jul	>60	---	High-----	High-----	Low.
2781B*: Urban land.												
Friesland--------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
2783A*: Urban land.												
Flagler----------	B	None to rare	---	---	>6.0	---	---	>60	---	Low------	Moderate	Low.
4776-------------- Comfrey	B/D	Common------	Brief to long.	Apr-Jul	0-1.0	Apparent	Apr-Jul	>60	---	High-----	High-----	Low.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--ENGINEERING TEST DATA

Soil name and location	Parent material	Report number	Depth	Moisture density: Maximum dry density	Moisture density: Optimum moisture	Percentage passing sieve--: No. 4	No. 10	No. 40	No. 200	Percentage smaller than--: 0.05 mm	0.02 mm	0.005 mm	0.002 mm	Liquid limit	Plasticity index	Classification: AASHTO	Classification: Unified
			In	Lb/cu ft	Pct												
Beardstown silt loam: Winnebago County, 1,195 feet north and 1,290 feet east of the southwest corner of sec. 33, T. 45 N., R. 1 E.	Silty and loamy sediments.	101-6-1	0-8	90.2	28.5	100	100	97.4	83.9	78.3	63.8	31.0	20.4	47.9	15.3	A-7-5 (15)	ML
		101-6-2 & 3	8-21	108.7	16.7	100	100	95.4	77.5	70.5	52.8	23.0	12.8	26.2	5.3	A-4(3)	ML-CL
		101-6-5 & 6	24-36	111.0	15.9	97.5	92.5	86.9	60.1	53.9	40.3	25.5	22.3	35.1	17.9	A-6(8)	CL
		101-6-8	48-54	125.4	9.5	86.0	79.7	54.6	17.3	15.0	10.2	8.5	5.5	---	NP[1]	A-2-4(0)	SM
Griswold sandy loam: Winnebago County, 240 feet south and 90 feet east of the northwest corner of sec. 10, T. 45 N., R. 2 E. (Modal)	Aeolian sands and sandy loam glacial drift.	101-25-1 & 2	0-15	119.2	11.7	99.9	99.8	91.1	39.7	35.3	27.3	17.0	12.9	22.1	7.3	A-4(0)	SC
		101-25-5	26-36	122.8	10.5	90.4	84.6	73.0	36.0	32.1	25.0	17.8	14.6	23.8	10.7	A-6(0)	SC
		101-25-6	36-48	---	---	89.5	84.4	70.1	35.1	31.1	22.7	12.7	9.8	14.1	2.8	A-4(0)	SM
Hayfield loam: Boone County, 141 feet south and 880 feet west of the center of sec. 1, T. 43 N., R. 4 E. (Modal)	Loamy material over sand.	4-15-1 & 2	0-14	110.8	15.2	99.9	99.6	93.5	41.2	36.5	25.2	15.5	11.3	29.0	8.2	A-4(0)	SC
		4-15-3	14-24	116.1	13.8	98.8	97.2	88.5	56.2	53.9	44.6	25.9	18.2	27.3	12.0	A-6(4)	CL
		4-15-4 & 5	24-39	117.0	12.0	99.7	99.6	81.4	17.6	15.9	13.0	9.5	8.5	---	NP[1]	A-2-4(0)	SM
Hononegah loamy coarse sand: Winnebago County, 170 feet north and 2,060 feet east of the center of sec. 11, T. 46 N., R. 1 E. (Modal)	Sands over calcareous gravel.	101-1-1	0-8	122.7	10.7	100	100	66.7	23.1	17.8	11.4	7.0	6.5	18.9	2.8	A-2-4(0)	SM
		101-1-4	19-24	128.9	8.8	88.3	84.1	51.5	17.2	15.5	10.9	9.3	7.3	15.7	2.6	A-2-4(0)	SM
		101-1-6	31-48	142.5	7.2	33.7	23.9	14.6	2.5	1.3	1.0	0.4	0.3	---	NP[1]	A-1-9(0)	SP
Plano silt loam: Winnebago County, 700 feet north and 470 feet west of the southeast corner of sec. 3, T. 43 N., R. 2 E.	Loess and loamy slope wash.	101-10-1	0-10	105.0	17.8	---	100	99.5	95.7	89.5	64.5	33.0	23.5	38.2	16.0	A-6(16)	CL
		101-10-3 & 4	17-37	97.5	21.7	99.6	99.5	99.1	95.7	92.4	67.1	36.4	30.0	42.8	21.8	A-7-6 (22)	CL
		101-10-6	47-62	123.0	11.5	92.9	90.2	78.5	41.4	36.8	27.2	18.9	15.0	22.4	8.5	A-4(0)	SC
		101-10-7	62-65	133.5	8.3	86.6	82.4	71.1	39.8	34.5	25.0	14.0	10.2	18.2	5.8	A-4(0)	SM-SC
Varna silt loam: Boone County, 627 feet north and 117 feet west of the southeast corner of sec. 15, T. 23 N., R. 3 E.	Loamy material over loam till.	4-13-1 & 2	0-14	105.9	21.7	99.9	99.8	94.4	80.5	77.8	73.4	36.5	23.4	45.0	18.9	A-7-6 (16)	CL
		4-13-4	20-28	100.6	17.2	99.4	98.5	96.0	80.4	76.0	75.1	46.8	39.1	45.8	24.0	A-7-6 (20)	CL
		4-13-6	36-47	120.6	13.0	97.4	94.2	92.9	77.4	74.2	64.2	39.2	25.0	27.5	11.4	A-6(7)	CL

[1]NP - nonplastic

TABLE 18.--CLASSIFICATION OF THE SOILS

[An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series]

Soil name	Family or higher taxonomic class
Adrian	Sandy or sandy-skeletal, mixed, euic, mesic Terric Medisaprists
Andres	Fine-loamy, mixed, mesic Aquic Argiudolls
Argyle	Fine-loamy, mixed, mesic Mollic Hapludalfs
Ashdale	Fine-silty, mixed, mesic Typic Argiudolls
Assumption	Fine-silty, mixed, mesic Typic Argiudolls
Atterberry	Fine-silty, mixed, mesic Udollic Ochraqualfs
Backbone	Coarse-loamy, mixed, mesic Mollic Hapludalfs
Beardstown	Fine-loamy, mixed, mesic Udollic Ochraqualfs
Billett	Coarse-loamy, mixed, mesic Mollic Hapludalfs
Chelsea	Mixed, mesic Alfic Udipsamments
Comfrey	Fine-loamy, mixed, mesic Cumulic Haplaquolls
Dakota	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Argiudolls
Dodgeville	Fine-silty over clayey, mixed, mesic Typic Argiudolls
Downs	Fine-silty, mixed, mesic Mollic Hapludalfs
Drummer	Fine-silty, mixed, mesic Typic Haplaquolls
Dunbarton	Clayey, montmorillonitic, mesic Lithic Hapludalfs
Edmund	Clayey, montmorillonitic, mesic Lithic Argiudolls
Elburn	Fine-silty, mixed, mesic Aquic Argiudolls
Elco	Fine-silty, mixed, mesic Typic Hapludalfs
Elliott	Fine, illitic, mesic Aquic Argiudolls
Fayette	Fine-silty, mixed, mesic Typic Hapludalfs
Flagg	Fine-silty, mixed, mesic Typic Hapludalfs
Flagler	Coarse-loamy, mixed, mesic Typic Hapludolls
Fox	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Hapludalfs
Friesland	Fine-loamy, mixed, mesic Typic Argiudolls
Grellton	Fine-loamy, mixed, mesic Typic Hapludalfs
Griswold	Fine-loamy, mixed, mesic Typic Argiudolls
Hayfield	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Aquollic Hapludalfs
Herbert	Fine-silty, mixed, mesic Udollic Ochraqualfs
Hitt	Fine-loamy, mixed, mesic Typic Argiudolls
Hononegah	Sandy, mixed, mesic Entic Hapludolls
Hoopeston	Coarse-loamy, mixed, mesic Aquic Hapludolls
Houghton	Euic, mesic Typic Medisaprists
Jasper	Fine-loamy, mixed, mesic Typic Argiudolls
Juneau	Coarse-silty, mixed, nonacid, mesic Typic Udifluvents
Kane	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Aquic Argiudolls
Kendall	Fine-silty, mixed, mesic Aeric Ochraqualfs
Kidder	Fine-loamy, mixed, mesic Typic Hapludalfs
*La Hogue	Fine-loamy, mixed, mesic Aquic Argiudolls
Lawson	Fine-silty, mixed, mesic Cumulic Hapludolls
Lisbon	Fine-silty, mixed, mesic Aquic Argiudolls
Marshan	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Haplaquolls
Martinsville	Fine-loamy, mixed, mesic Typic Hapludalfs
McHenry	Fine-loamy, mixed, mesic Typic Hapludalfs
Miami	Fine-loamy, mixed, mesic Typic Hapludalfs
Millington	Fine-loamy, mixed (calcareous), mesic Cumulic Haplaquolls
Muscatine	Fine-silty, mixed, mesic Aquic Hapludolls
NewGlarus	Fine-silty over clayey, mixed, mesic Typic Hapludalfs
Ockley	Fine-loamy, mixed, mesic Typic Hapludalfs
Odell	Fine-loamy, mixed, mesic Aquic Argiudolls
Ogle	Fine-silty, mixed, mesic Typic Argiudolls
Orion	Coarse-silty, mixed, nonacid, mesic Aquic Udifluvents
Orthents	Loamy, mixed, mesic Udorthents
Palms	Loamy, mixed, euic, mesic Terric Medisaprists
Palsgrove	Fine-silty, mixed, mesic Typic Hapludalfs
Parr	Fine-loamy, mixed, mesic Typic Argiudolls
Pecatonica	Fine-loamy, mixed, mesic Typic Hapludalfs
Plano	Fine-silty, mixed, mesic Typic Argiudolls
Ringwood	Fine-loamy, mixed, mesic Typic Argiudolls
Rockton	Fine-loamy, mixed, mesic Typic Argiudolls
Rodman	Sandy-skeletal, mixed, mesic Typic Hapludolls
Rozetta	Fine-silty, mixed, mesic Typic Hapludalfs
Sable	Fine-silty, mixed, mesic Typic Haplaquolls
Sawmill	Fine-silty, mixed, mesic Cumulic Haplaquolls
Saybrook	Fine-silty, mixed, mesic Typic Argiudolls
Selma	Fine-loamy, mixed, mesic Typic Haplaquolls
*Sogn	Loamy, mixed, mesic Lithic Haplustolls
St. Charles	Fine-silty, mixed, mesic Typic Hapludalfs
Stronghurst	Fine-silty, mixed, mesic Aeric Ochraqualfs

TABLE 18.--CLASSIFICATION OF THE SOILS--Continued

Soil name	Family or higher taxonomic class
Tama	Fine-silty, mixed, mesic Typic Argiudolls
Troxel	Fine-silty, mixed, mesic Typic Argiudolls
Varna	Fine, illitic, mesic Typic Argiudolls
Virgil	Fine-silty, mixed, mesic Udollic Ochraqualfs
Warsaw	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Argiudolls
Waupecan	Fine-silty, mixed, mesic Typic Argiudolls
Wea	Fine-loamy, mixed, mesic Typic Argiudolls
Westville	Fine-loamy, mixed, mesic Typic Hapludalfs
Whalan	Fine-loamy, mixed, mesic Typic Hapludalfs
Will	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Haplaquolls
Winnebago	Fine-loamy, mixed, mesic Typic Argiudolls

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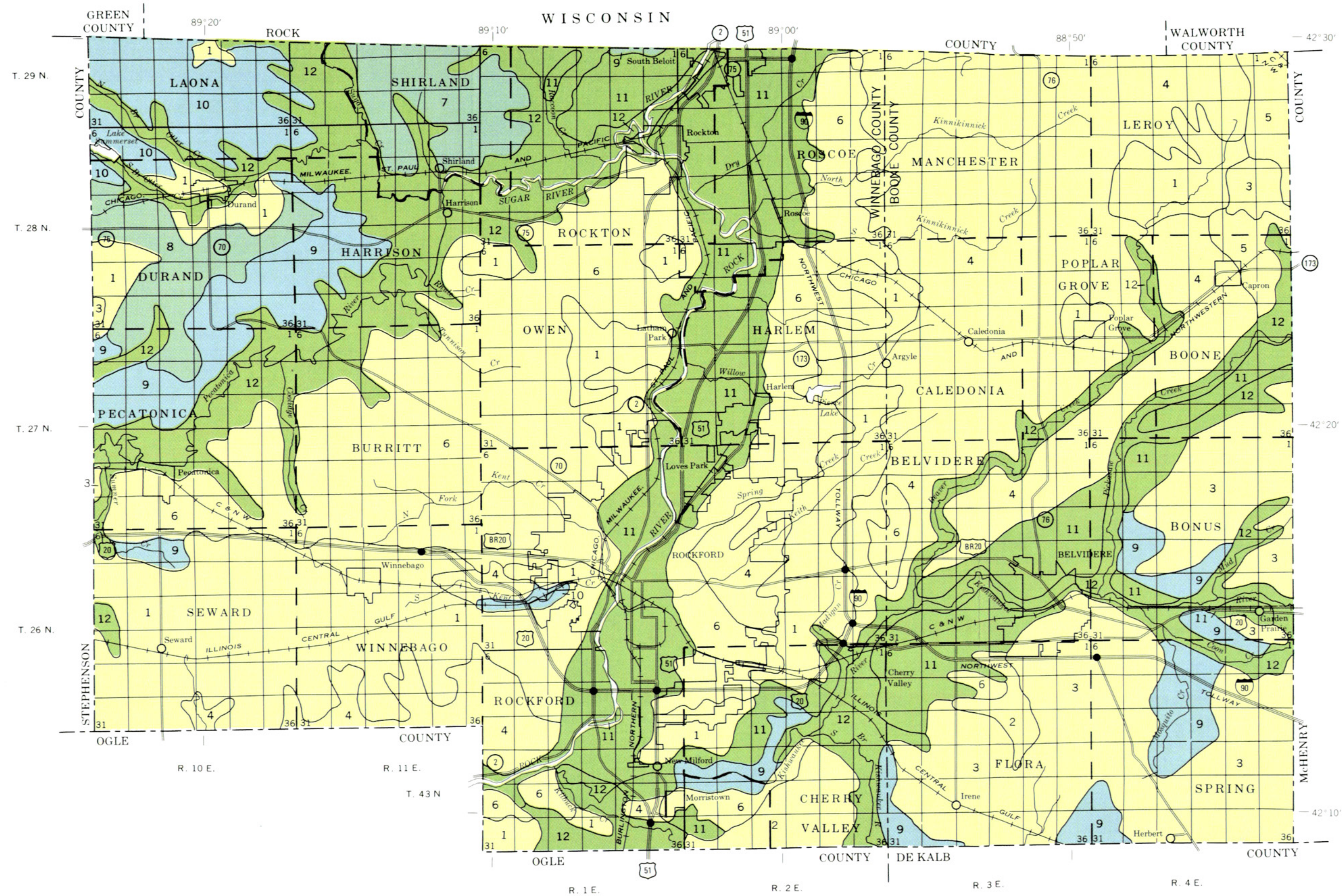
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ILLINOIS AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

WINNEBAGO AND BOONE COUNTIES, ILLINOIS

Scale 1:190,080

1 0 1 2 3 4 Miles



SOIL LEGEND

AREAS DOMINATED BY NEARLY LEVEL TO STRONGLY SLOPING SOILS THAT FORMED IN LOESS AND GLACIAL DEPOSITS; ON UPLANDS

1 Tama–Ogle–Plano: Deep, well drained, nearly level to sloping soils that formed in loess or in loess and the underlying glacial deposits; on uplands

2 Varna–Andres: Deep, moderately well drained and somewhat poorly drained, nearly level and gently sloping soils that formed in loess and the underlying glacial till; on uplands

3 Drummer–Parr: Deep, well drained and poorly drained, nearly level to sloping soils that formed in loess and the underlying glacial till or outwash; on uplands

4 Flagg–Pecatonica: Deep, well drained, nearly level to sloping soils that formed in loess and the underlying glacial drift; on uplands

5 Miami–Kendall: Deep, well drained and somewhat poorly drained, nearly level to sloping soils that formed in thin loess and the underlying glacial till or in glacial outwash; on uplands

6 Griswold–Winnebago: Deep, well drained, gently sloping to strongly sloping soils that formed in glacial till or in thin loess and the underlying glacial drift; on uplands

AREAS DOMINATED BY GENTLY SLOPING TO STRONGLY SLOPING SOILS THAT FORMED IN LOESS, WINDBLOWN SAND, GLACIAL DRIFT, OR RESIDUUM OF DOLOMITE; ON UPLANDS

7 Edmund–Chelsea–Winnebago: Shallow and deep, well drained and excessively drained, gently sloping to strongly sloping soils that formed in loess and the underlying residuum of dolomite, in windblown sand, and in thin loess and the underlying glacial drift; on uplands

8 Ashdale–Rockton–Dodgeville: Moderately deep and deep, well drained, gently sloping to strongly sloping soils that formed in loess and the underlying residuum of dolomite and in glacial drift and the underlying residuum of dolomite; on uplands

AREAS DOMINATED BY GENTLY SLOPING TO MODERATELY STEEP SOILS THAT FORMED IN LOESS OR IN LOESS AND THE UNDERLYING RESIDUUM OF DOLOMITE; ON UPLANDS

9 Fayette–Palsgrove: Deep, well drained, gently sloping and sloping soils that formed in loess and in loess and the underlying residuum of dolomite; on uplands

10 Whalan–NewGlarus–Dunbarton: Moderately deep and shallow, well drained, gently sloping to moderately steep soils that formed in loess and the underlying residuum of dolomite; on uplands

AREAS DOMINATED BY NEARLY LEVEL TO SLOPING SOILS THAT FORMED IN ALLUVIAL AND OUTWASH SEDIMENT; ON STREAM TERRACES AND FLOOD PLAINS

11 Flagler–Warsaw–Hononegah: Deep, well drained to excessively drained, nearly level to sloping soils that formed in loamy and sandy sediment underlain by sandy and gravelly sediment; on high stream terraces

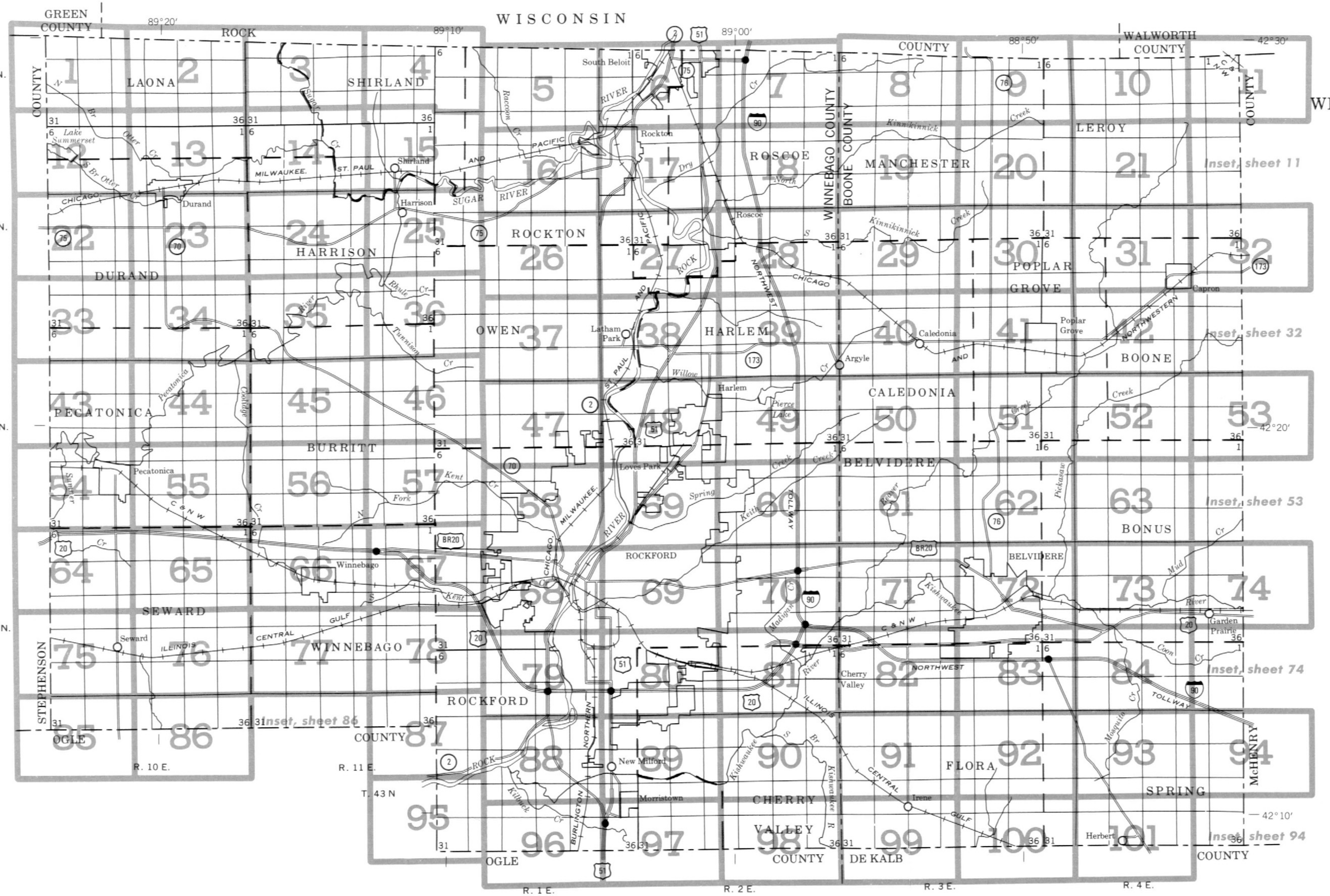
12 Comfrey–Selma: Deep, poorly drained, nearly level soils that formed in recent alluvium or in outwash sediment; on flood plains and low stream terraces

Compiled 1978

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



INDEX TO MAP SHEETS

WINNEBAGO AND BOONE COUNTIES, ILLINOIS

Scale 1 : 190,080

1 0 1 2 3 4 Miles

Original text from each individual map sheet read:

This map is compiled on 1970 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEMS & DESIGNATIONS

- Interstate
- Federal
- State
- County, farm or ranch

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label)
- Located object (label)
- Tank (label)
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label)
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial
- Intermittent

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown)

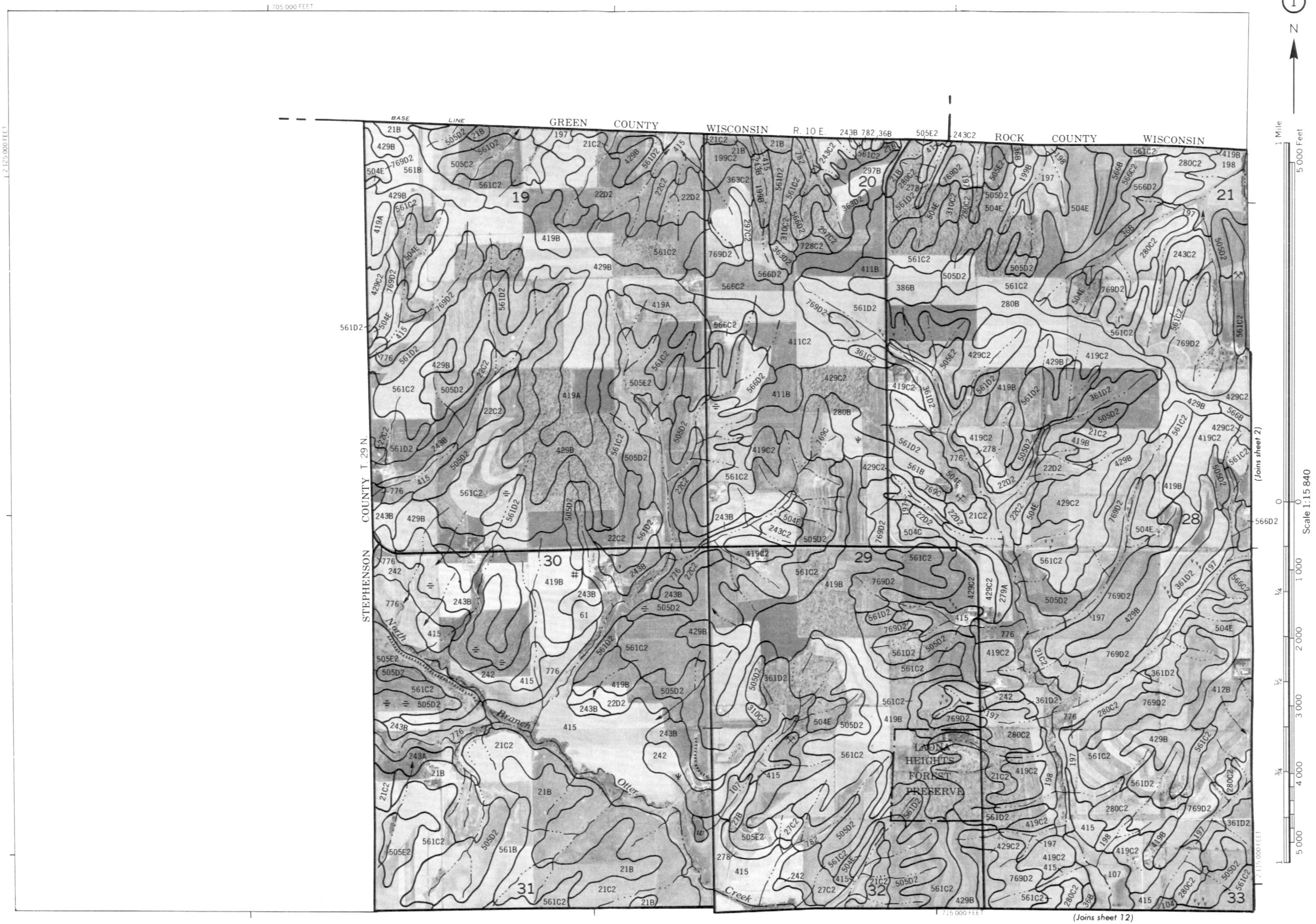
MISCELLANEOUS

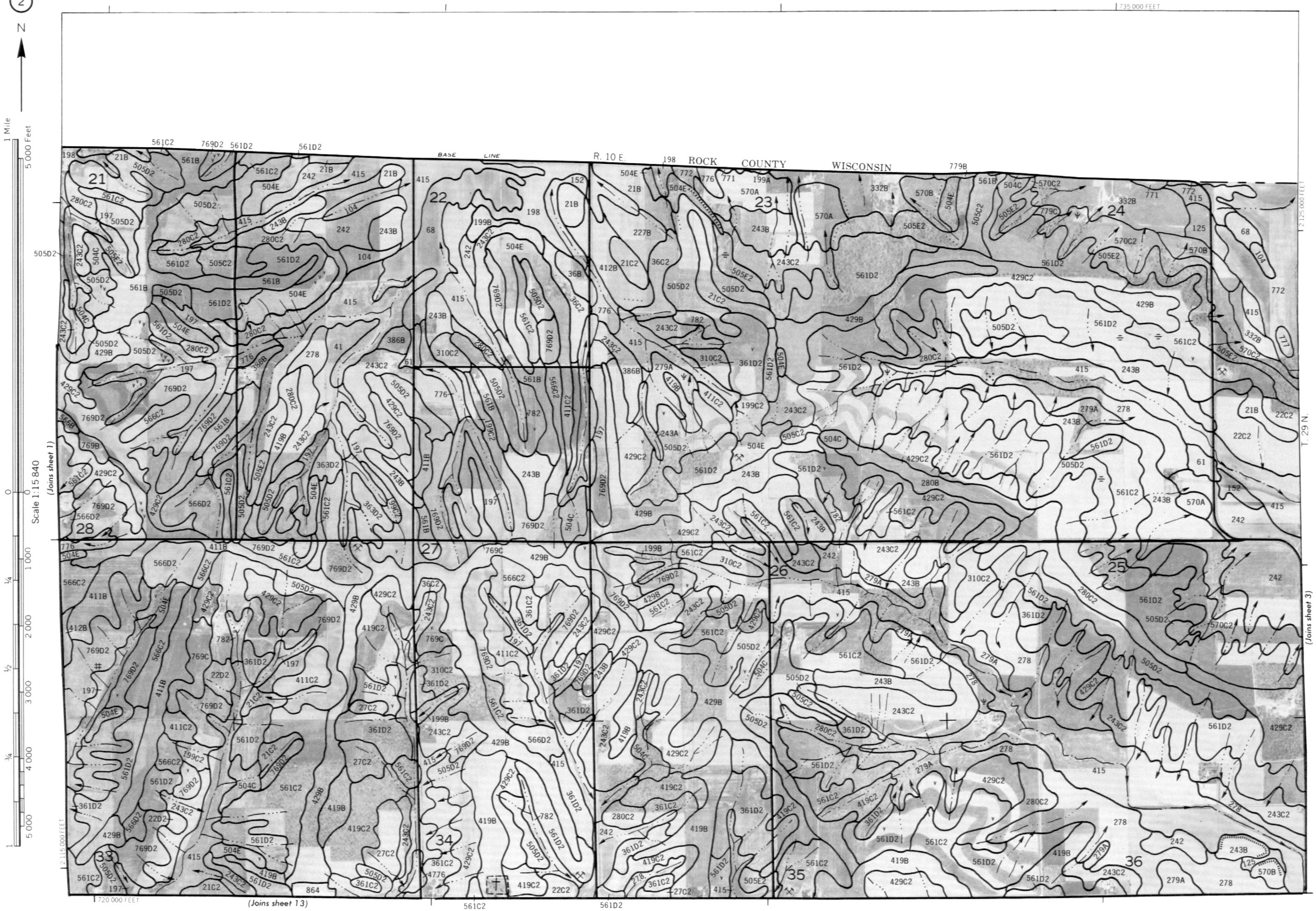
- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot
- Made land spot
- Glacial till spot
- Calcareous spot
- Muck spot

SOIL LEGEND

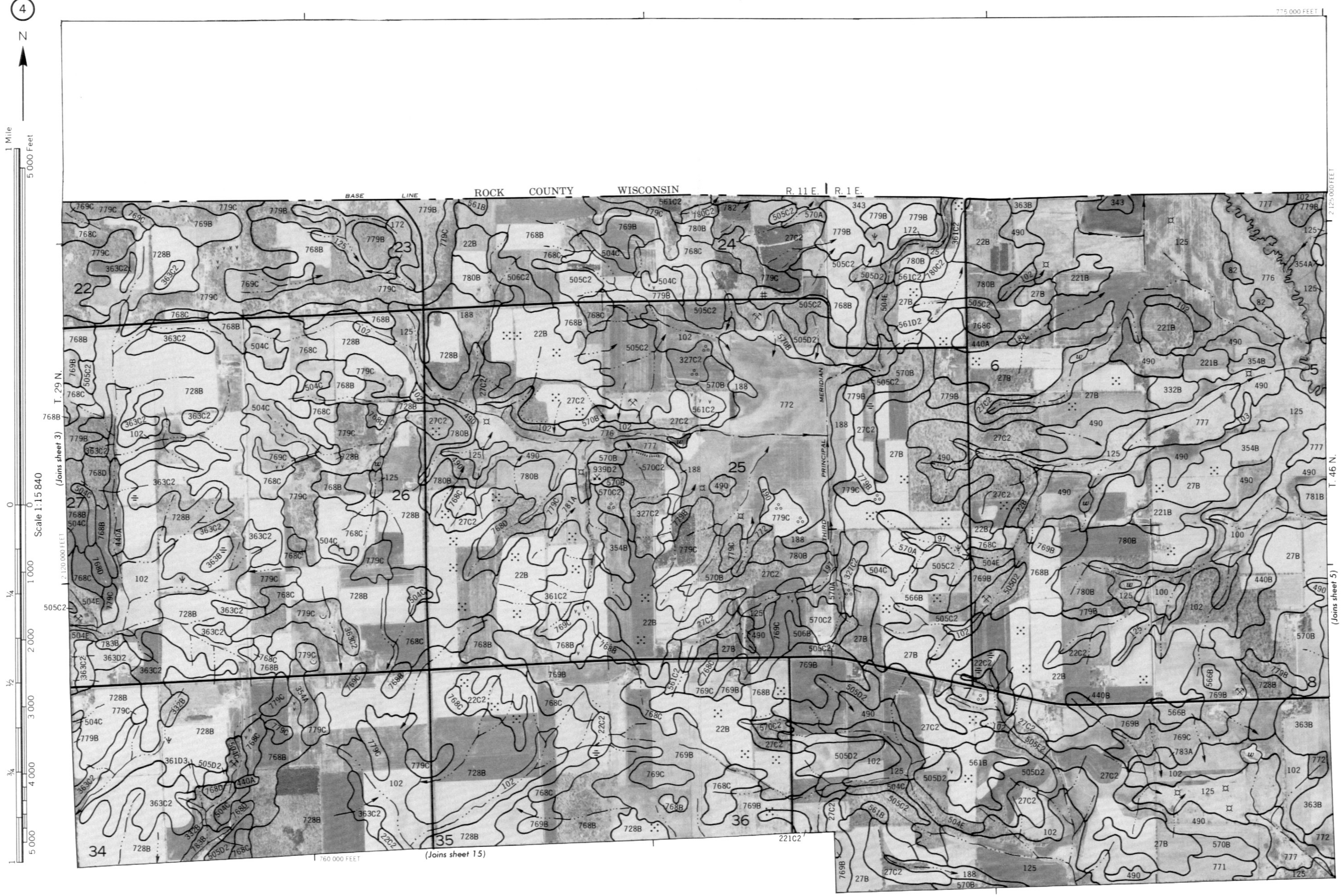
Symbols consist of numbers or a combination of numbers and letters; for example, 61, 227B, and 411C2. The numbers alone or preceding a capital letter designate the kind of soil. The capital letter A, B, C, D, or E indicates the slope. Most symbols without a slope letter are those for level or nearly level soils, but some are for miscellaneous areas that have a considerable range of slope. A final number of 2 or 3 in the symbol indicates that the soil is eroded or severely eroded, respectively.

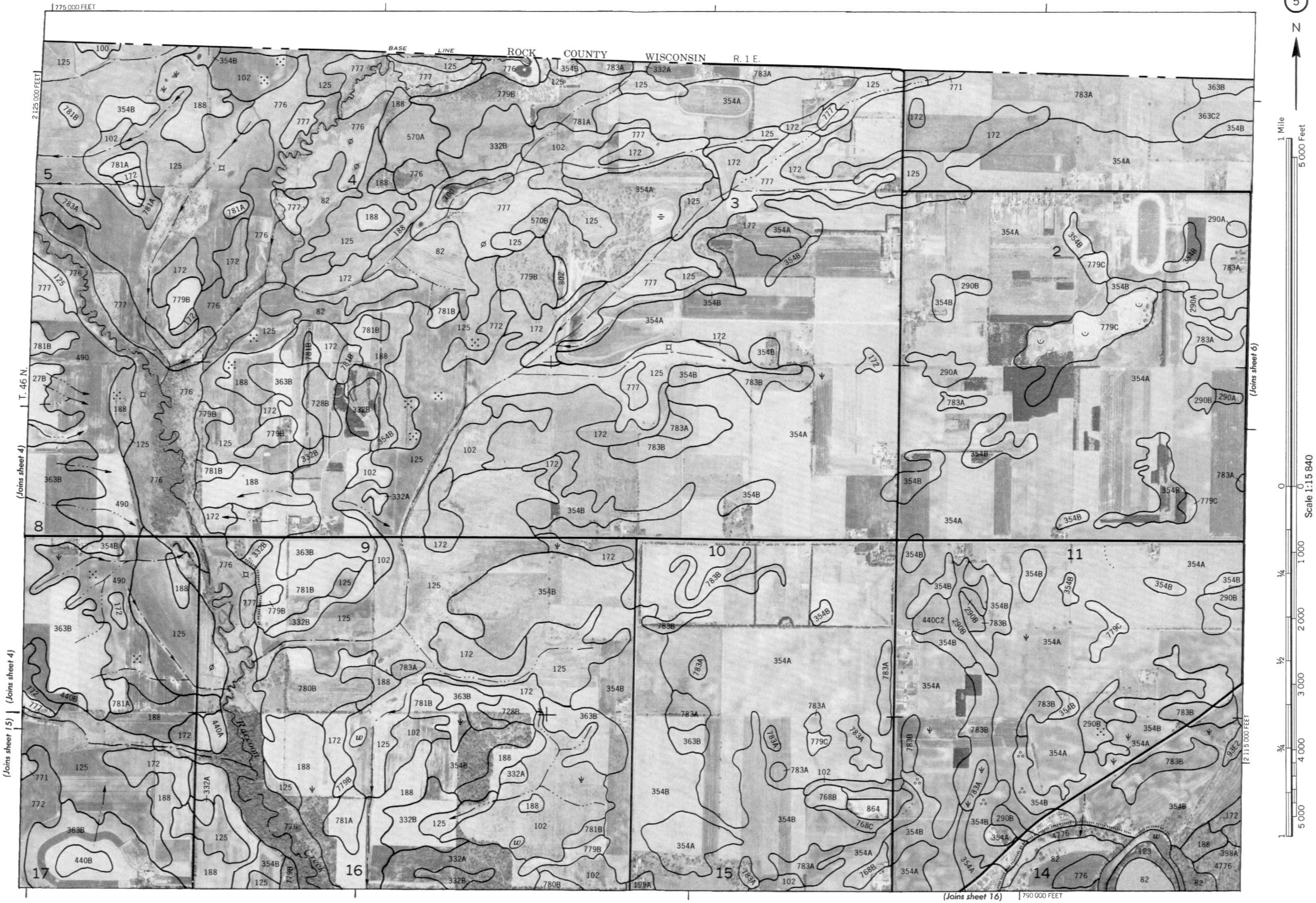
SYMBOL	NAME	SYMBOL	NAME
21B	Pecatonica silt loam, 2 to 5 percent slopes	386B	Downs silt loam, 2 to 6 percent slopes
21C2	Pecatonica silt loam, 5 to 9 percent slopes, eroded	387A	Ockley silt loam, 0 to 2 percent slopes
22B	Westville silt loam, 2 to 5 percent slopes	387B	Ockley silt loam, 2 to 5 percent slopes
22C2	Westville silt loam, 5 to 9 percent slopes, eroded	398A	Wea silt loam, 0 to 2 percent slopes
22D2	Westville silt loam, 9 to 15 percent slopes, eroded	398B	Wea silt loam, 2 to 5 percent slopes
27B	Miami silt loam, 1 to 5 percent slopes	411B	Ashdale silt loam, 2 to 5 percent slopes
27C2	Miami silt loam, 5 to 9 percent slopes, eroded	411C2	Ashdale silt loam, 5 to 9 percent slopes, eroded
36A	Tama silt loam, 0 to 2 percent slopes	412B	Ogle silt loam, 2 to 5 percent slopes
36B	Tama silt loam, 2 to 5 percent slopes	415	Orion silt loam
36C2	Tama silt loam, 5 to 9 percent slopes, eroded	419A	Flagg silt loam, 0 to 2 percent slopes
41	Muscatine silt loam	419B	Flagg silt loam, 2 to 5 percent slopes
59	Lisbon silt loam	419C2	Flagg silt loam, 5 to 9 percent slopes, eroded
61	Atterberry silt loam	429B	Palsgrove silt loam, 2 to 5 percent slopes
62	Herbert silt loam	429C2	Palsgrove silt loam, 5 to 9 percent slopes, eroded
68	Sable silty clay loam	440A	Jasper silt loam, 0 to 2 percent slopes
82	Millington silt loam	440B	Jasper silt loam, 2 to 5 percent slopes
93E2	Rodman gravelly loam, 12 to 30 percent slopes, eroded	440C2	Jasper silt loam, 5 to 9 percent slopes, eroded
100	Palms muck	451	Lawson silt loam
102	La Hogue silt loam	490	Odell silt loam
103	Houghton muck	504C	Sogn silt loam, 4 to 12 percent slopes
104	Virgil silt loam	504E	Sogn silt loam, 12 to 30 percent slopes
107	Sawmill silty clay loam	505C2	Dunbarton silt loam, 4 to 7 percent slopes, eroded
119B	Elco silt loam, 2 to 6 percent slopes	505D2	Dunbarton silt loam, 7 to 12 percent slopes, eroded
123	Riverwash	505E2	Dunbarton silt loam, 12 to 20 percent slopes, eroded
125	Selma loam	506A	Hitt silt loam, 0 to 2 percent slopes
145B	Saybrook silt loam, 2 to 5 percent slopes	506B	Hitt silt loam, 2 to 5 percent slopes
145C2	Saybrook silt loam, 5 to 9 percent slopes, eroded	506C2	Hitt silt loam, 5 to 9 percent slopes, eroded
146	Elliott silt loam	533	Urban land
152	Drummer silty clay loam	561B	Whalan and NewGlarus silt loams, 2 to 5 percent slopes
172	Hoopeston sandy loam	561C2	Whalan and NewGlarus silt loams, 5 to 9 percent slopes, eroded
188	Beardstown loam	561D2	Whalan and NewGlarus silt loams, 9 to 15 percent slopes, eroded
197	Troxel silt loam	566B	Rockton and Dodgeville soils, 1 to 5 percent slopes
198	Elburn silt loam	566C2	Rockton and Dodgeville soils, 5 to 9 percent slopes, eroded
199A	Plano silt loam, 0 to 2 percent slopes	566D2	Rockton and Dodgeville soils, 9 to 15 percent slopes, eroded
199B	Plano silt loam, 2 to 5 percent slopes	570A	Martinsville silt loam, 0 to 2 percent slopes
199C2	Plano silt loam, 5 to 9 percent slopes, eroded	570B	Martinsville silt loam, 2 to 5 percent slopes
221B	Parr silt loam, 2 to 5 percent slopes	570C2	Martinsville silt loam, 5 to 9 percent slopes, eroded
221C2	Parr silt loam, 5 to 9 percent slopes, eroded	728B	Winnebago silt loam, 2 to 5 percent slopes
223B	Varna silt loam, 2 to 6 percent slopes	728C2	Winnebago silt loam, 5 to 9 percent slopes, eroded
227B	Argyle silt loam, 2 to 6 percent slopes	728D2	Winnebago silt loam, 9 to 15 percent slopes, eroded
242	Kendall silt loam	768B	Backbone loamy sand, 2 to 5 percent slopes
243A	St. Charles silt loam, 0 to 2 percent slopes	768C	Backbone loamy sand, 5 to 9 percent slopes
243B	St. Charles silt loam, 2 to 5 percent slopes	768D	Backbone loamy sand, 9 to 15 percent slopes
243C2	St. Charles silt loam, 5 to 9 percent slopes, eroded	769B	Edmund silt loam, 2 to 5 percent slopes
259B2	Assumption silt loam, 2 to 6 percent slopes, eroded	769C	Edmund silt loam, 5 to 9 percent slopes
278	Stronghurst silt loam	769D2	Edmund silt loam, 9 to 15 percent slopes, eroded
279A	Rozetta silt loam, 0 to 3 percent slopes	771	Hayfield loam
280B	Fayette silt loam, 2 to 5 percent slopes	772	Marshan loam
280C2	Fayette silt loam, 5 to 9 percent slopes, eroded	776	Comfrey loam
290A	Warsaw loam, 0 to 2 percent slopes	777	Adrian muck
290B	Warsaw loam, 2 to 5 percent slopes	779B	Chelsea loamy fine sand, 2 to 7 percent slopes
290C2	Warsaw loam, 5 to 9 percent slopes, eroded	779C	Chelsea loamy fine sand, 7 to 12 percent slopes
293	Andres silt loam	780B	Grellton sandy loam, 1 to 5 percent slopes
297B	Ringwood silt loam, 2 to 5 percent slopes	780C2	Grellton sandy loam, 5 to 9 percent slopes, eroded
297C2	Ringwood silt loam, 5 to 9 percent slopes, eroded	781A	Friesland sandy loam, 0 to 2 percent slopes
310B	McHenry silt loam, 2 to 5 percent slopes	781B	Friesland sandy loam, 2 to 6 percent slopes
310C2	McHenry silt loam, 5 to 9 percent slopes, eroded	782	Juneau silt loam
327B	Fox loam, 1 to 5 percent slopes	783A	Flagler sandy loam, 0 to 3 percent slopes
327C2	Fox loam, 5 to 9 percent slopes, eroded	783B	Flagler sandy loam, 3 to 7 percent slopes
329	Will loam	802	Orthents, loamy
332A	Billett sandy loam, 0 to 2 percent slopes	864	Pits, quarry, limestone
332B	Billett sandy loam, 2 to 6 percent slopes	865	Pits, gravel
343	Kane silt loam	939C2	Rodman—Warsaw complex, 4 to 7 percent slopes, eroded
354A	Hononegah loamy coarse sand, 0 to 3 percent slopes	939D2	Rodman—Warsaw complex, 7 to 12 percent slopes, eroded
354B	Hononegah loamy coarse sand, 3 to 7 percent slopes	2145B	Urban land—Saybrook complex, 1 to 7 percent slopes
361B	Kidder loam, 2 to 5 percent slopes	2354A	Urban land—Hononegah complex, 0 to 3 percent slopes
361C2	Kidder loam, 5 to 9 percent slopes, eroded	2363B	Urban land—Griswold complex, 1 to 7 percent slopes
361D2	Kidder loam, 9 to 15 percent slopes, eroded	2363D	Urban land—Griswold complex, 7 to 15 percent slopes
361D3	Kidder clay loam, 9 to 15 percent slopes, severely eroded	2386B	Urban land—Downs complex, 1 to 7 percent slopes
363B	Griswold sandy loam, 2 to 5 percent slopes	2398A	Urban land—Wea complex, 0 to 3 percent slopes
363C2	Griswold sandy loam, 5 to 9 percent slopes, eroded	2566B	Urban land—Rockton complex, 1 to 7 percent slopes
363D2	Griswold sandy loam, 9 to 15 percent slopes, eroded	2776	Urban land—Comfrey complex
369	Waupecan silt loam	2781B	Urban land—Friesland complex, 1 to 7 percent slopes
379A	Dakota silt loam, 0 to 3 percent slopes	2783A	Urban land—Flagler complex, 0 to 3 percent slopes
386A	Downs silt loam, 0 to 2 percent slopes	4776	Comfrey loam, ponded

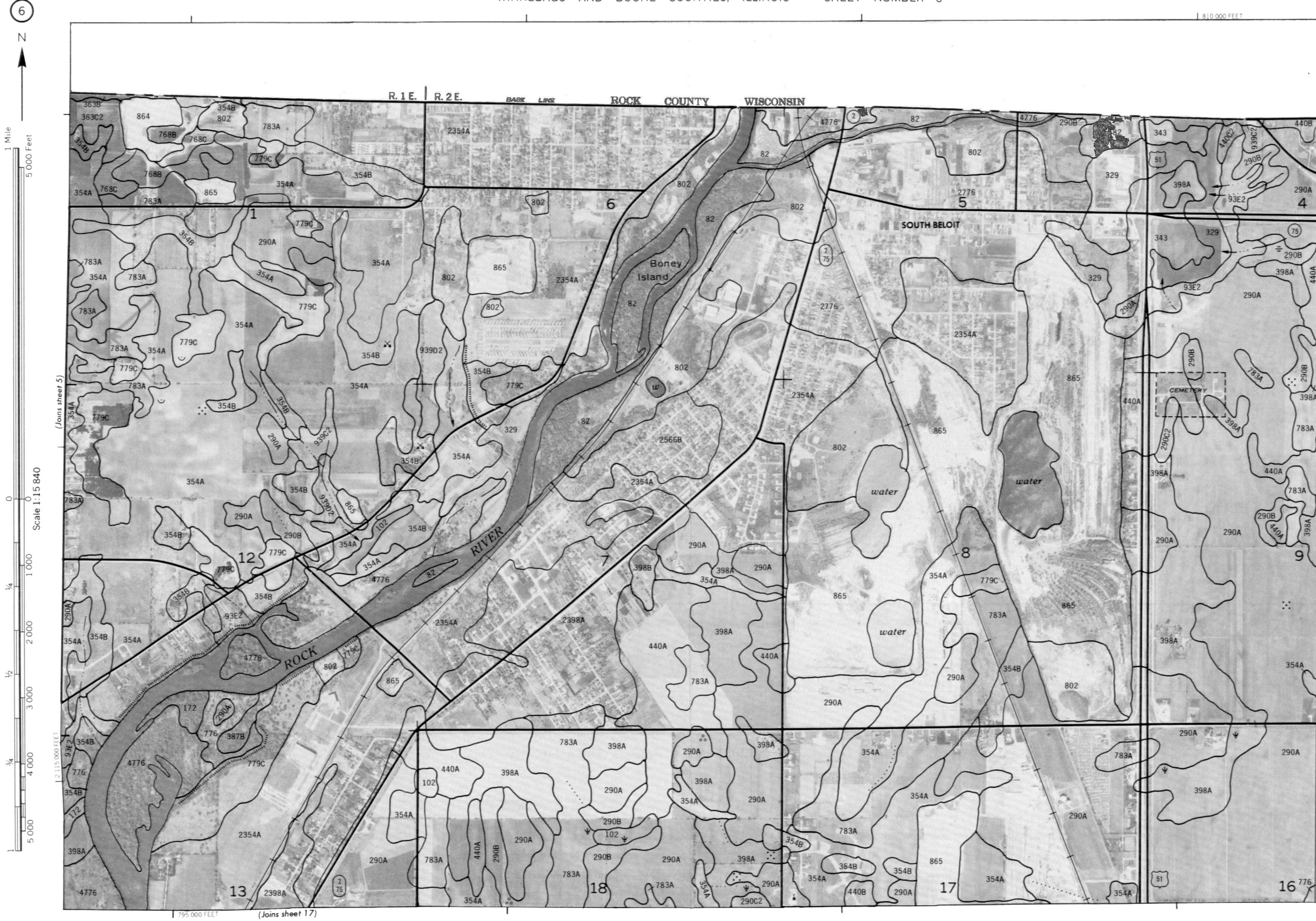

GREEN COUNTY WISCONSIN
R. 10 E.
ROCK COUNTY WISCONSIN
STEPHENSON COUNTY
T. 29 N.
LAONA HEIGHTS FOREST PRESERVE
North Branch
Otter Creek
(Joins sheet 2)
(Joins sheet 12)
705 000 FEET
715 000 FEET
N
1 Mile
5 000 Feet
Scale 1:15 840


N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 1)
(Joins sheet 3)
(Joins sheet 13)
R. 10 E.
T. 29 N.
ROCK COUNTY WISCONSIN
BASE LINE
735 000 FEET
720 000 FEET
21
22
23
24
25
26
27
28
33
34
35
36

3
N
BASE LINE
ROCK COUNTY WISCONSIN
R. 11 E.
T. 29 N.
SUGAR RIVER
(Joins sheet 2)
(Joins sheet 4)
(Joins sheet 14)
740 000 FEET
755 000 FEET
2 125 000 FEET
2 120 000 FEET
Scale 1:15 840
1 Mile
5 000 Feet

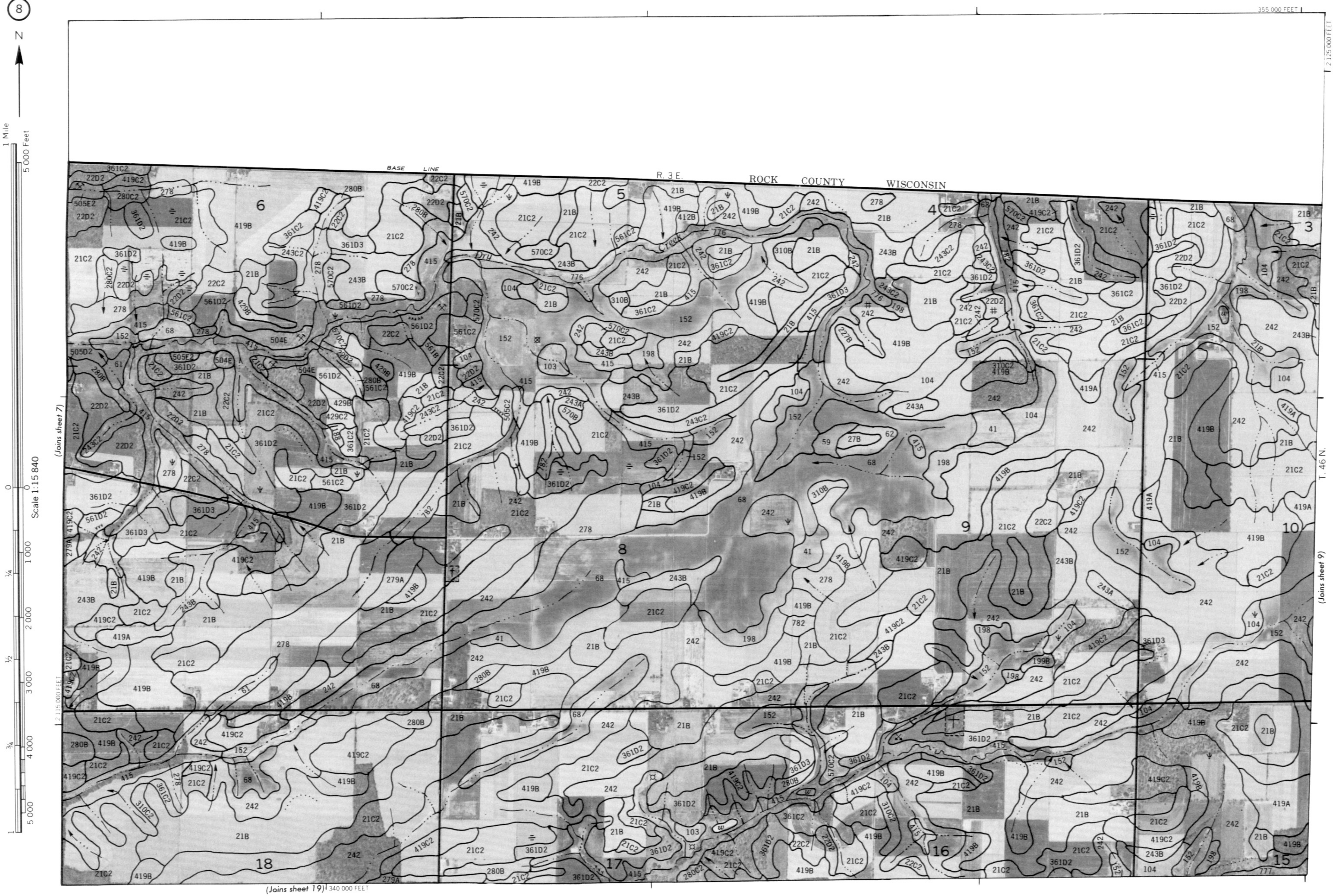

4
N
1 Mile
5 000 Feet
Scale 1:15 840
ROCK COUNTY WISCONSIN
BASE LINE
R. 11 E. | R. 1 E.
T. 29 N.
T. 46 N.
PRINCIPAL THIRD MERIDIAN
(Joins sheet 3)
(Joins sheet 5)
(Joins sheet 15)
775 000 FEET
760 000 FEET
2 125 000 FEET
2 120 000 FEET
22
23
24
25
26
27
34
35
36
5
6
7
8

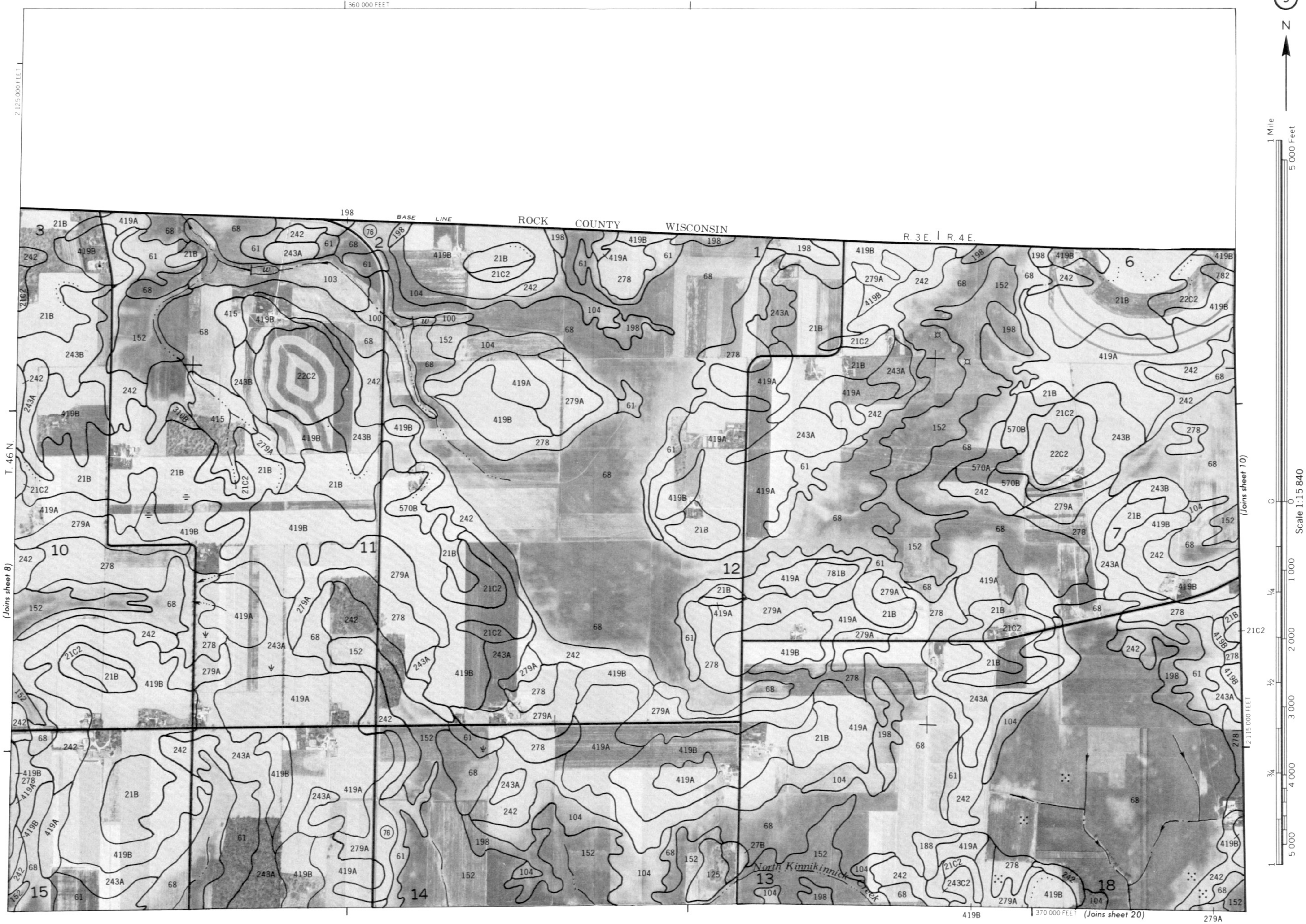

5
N
775 000 FEET
2 125 000 FEET
BASE LINE
ROCK COUNTY WISCONSIN
R. 1 E.
T. 46 N.
(Joins sheet 4)
(Joins sheet 6)
(Joins sheet 15)
(Joins sheet 16)
790 000 FEET
2 115 000 FEET
Raccoon Creek
1 Mile
5 000 Feet
Scale 1:15 840

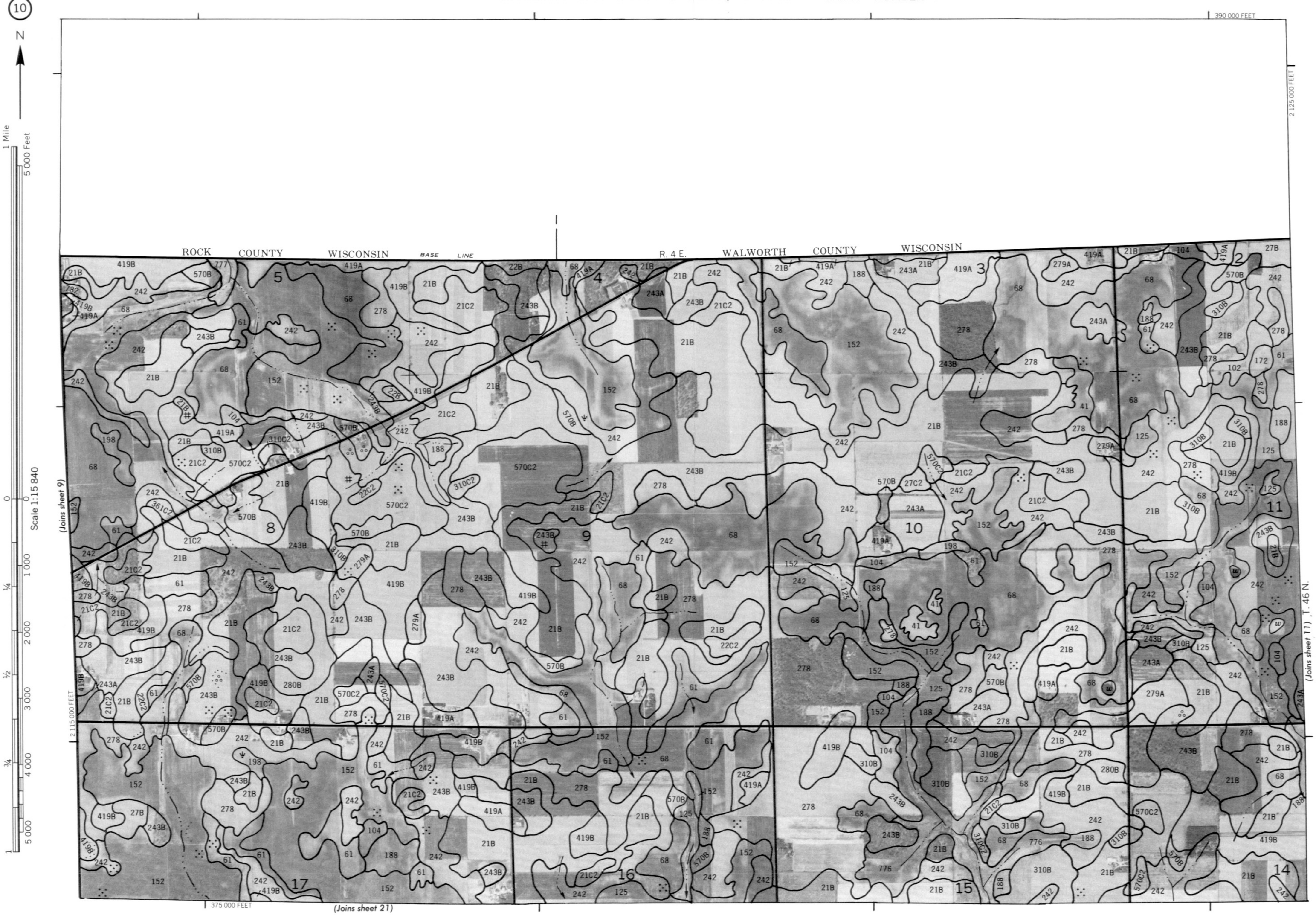

6
N
1 Mile
5 000 Feet
Scale 1:15 840
R. 1 E.
R. 2 E.
BASE LINE
ROCK COUNTY WISCONSIN
810 000 FEET
2 125 000 FEET
2 115 000 FEET
795 000 FEET
SOUTH BELOIT
Boney Island
ROCK
RIVER
CEMETERY
water
T. 46 N.
(Joins sheet 5)
(Joins sheet 7)
(Joins sheet 17)

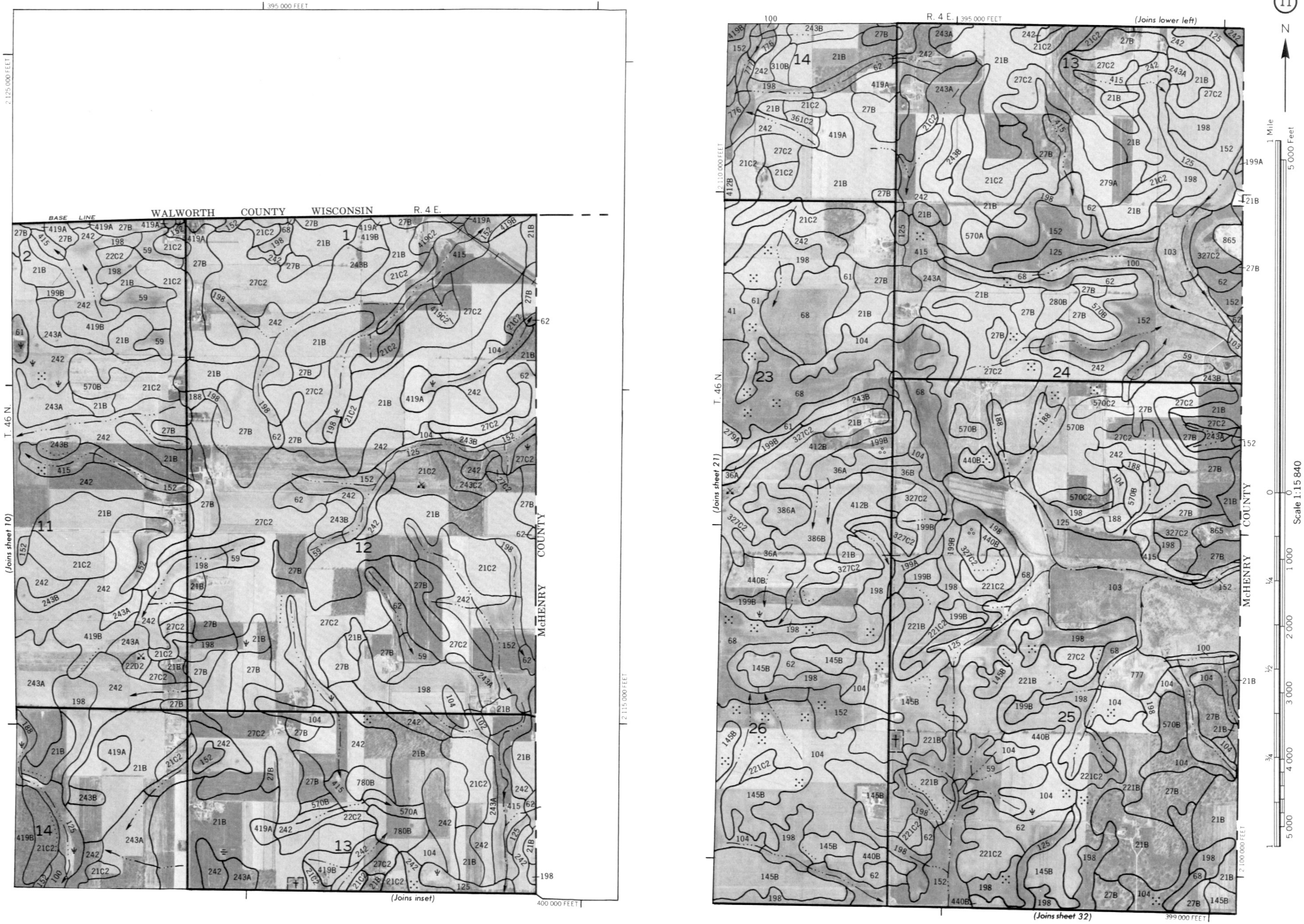

815 000 FEET
2 125 000 FEET
BASE LINE
ROCK COUNTY WISCONSIN
R. 2 E.
T. 46 N.
BOONE COUNTY
(Joins sheet 6)
(Joins sheet 8)
(Joins sheet 18)
Dry Creek
Creek
Dry
830 000 FEET
2 115 000 FEET
N
Scale 1:15 840
1 Mile
5 000 Feet
0
¼
½
¾
1
1 000
2 000
3 000
4 000
5 000

WINNEBAGO AND BOONE COUNTIES, ILLINOIS — SHEET NUMBER 8

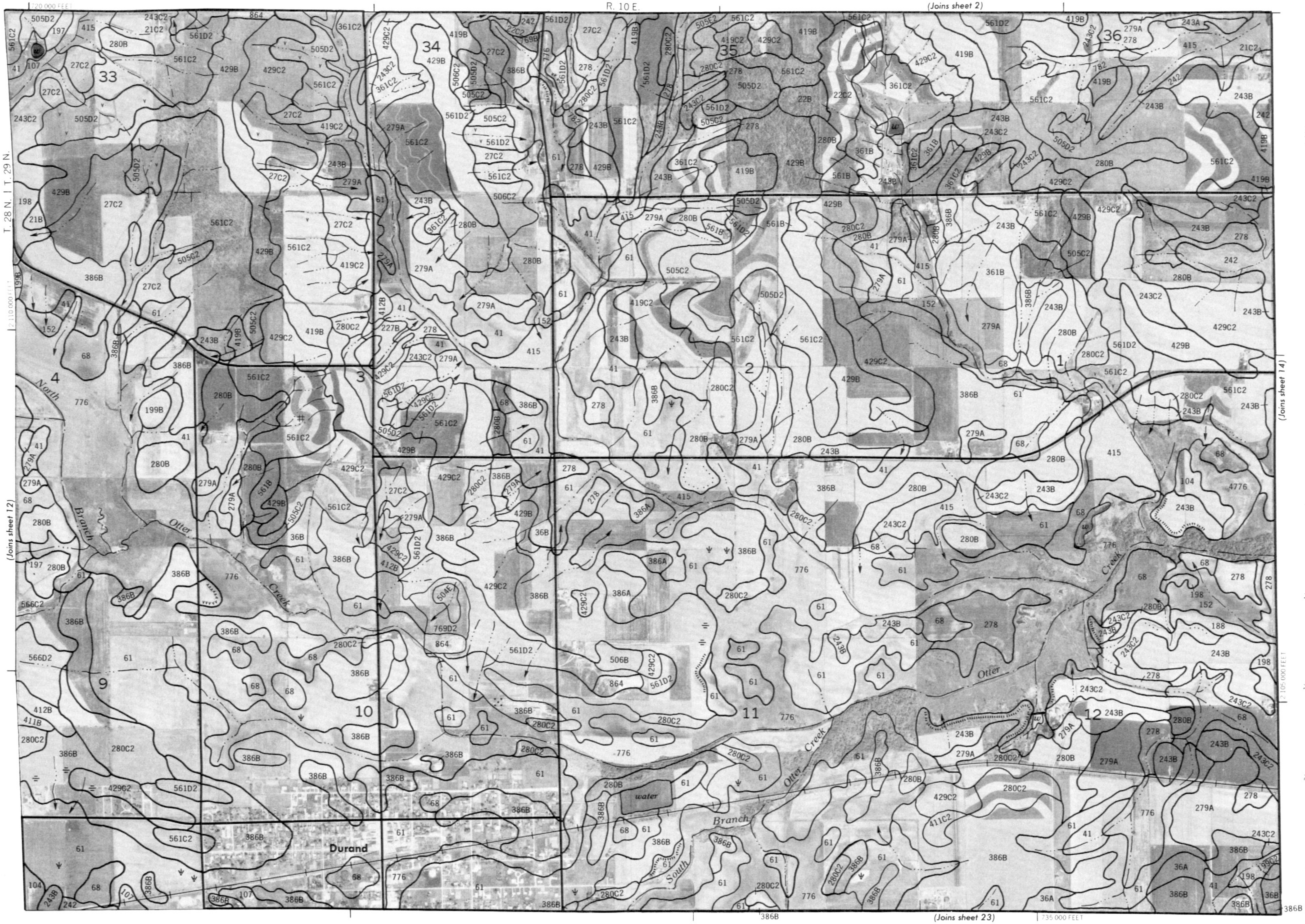



360 000 FEET
2 125 000 FEET
BASE LINE
ROCK COUNTY WISCONSIN
R. 3 E. | R. 4 E.
T. 46 N.
(Joins sheet 8)
(Joins sheet 10)
(Joins sheet 20)
North Kinnikinnick Creek
2 115 000 FEET
370 000 FEET
N
1 Mile
5 000 Feet
Scale 1:15 840


10
N
1 Mile
5 000 Feet
Scale 1:15 840
390 000 FEET
2 125 000 FEET
2 115 000 FEET
375 000 FEET
ROCK COUNTY WISCONSIN
BASE LINE
R. 4 E.
WALWORTH COUNTY WISCONSIN
T. 46 N.
(Joins sheet 9)
(Joins sheet 11)
(Joins sheet 21)

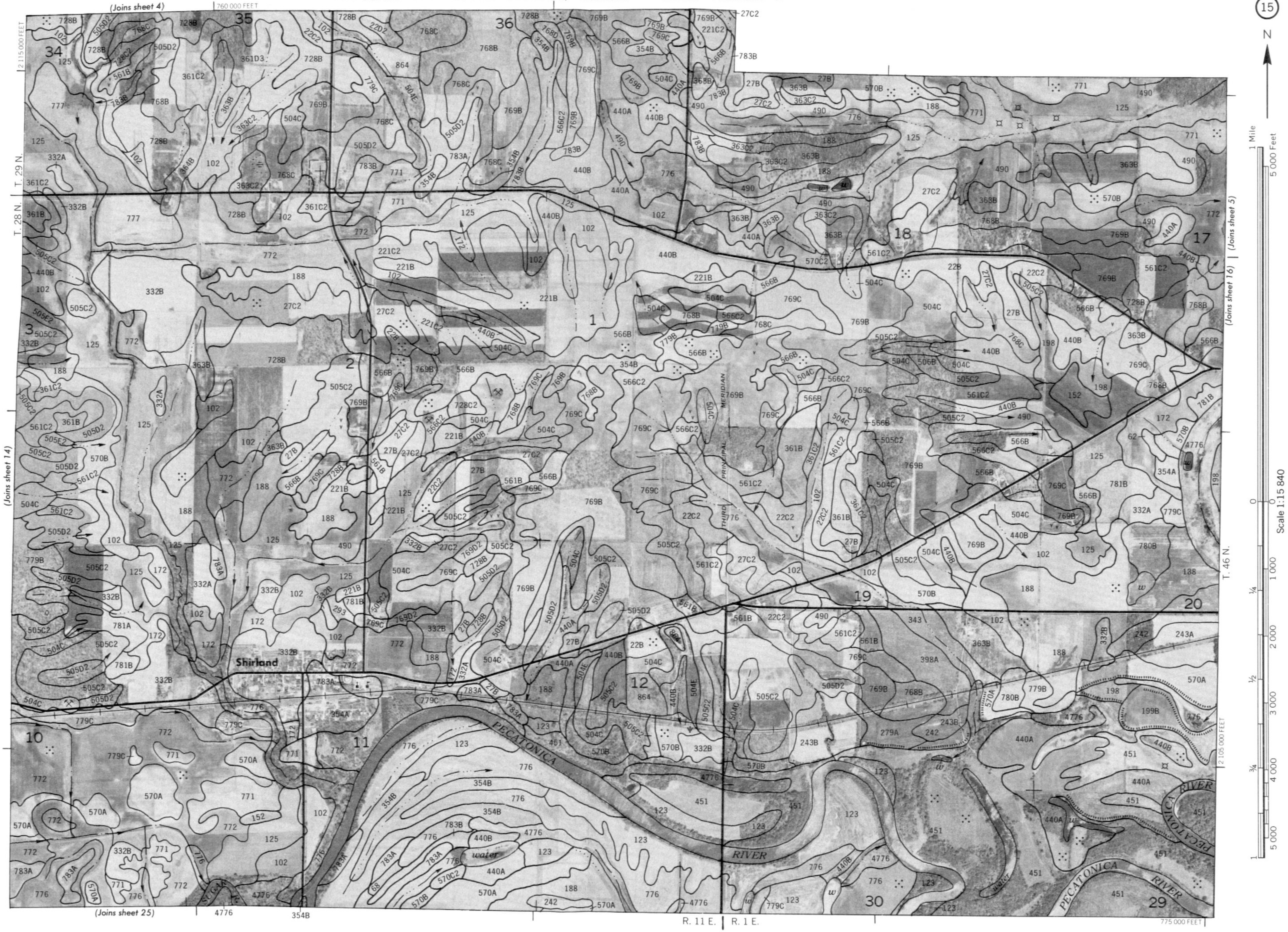

395 000 FEET
2 125 000 FEET
BASE LINE
WALWORTH COUNTY WISCONSIN
R. 4 E.
T. 46 N.
(Joins sheet 10)
McHENRY COUNTY
(Joins inset)
400 000 FEET
2 115 000 FEET
(Joins lower left)
2 110 000 FEET
(Joins sheet 21)
(Joins sheet 32)
2 100 000 FEET
399 000 FEET
N
1 Mile
5 000 Feet
Scale 1:15 840


12
N
1 Mile
5 000 Feet
Scale 1:15 840
R. 9 E.
R. 10 E.
(Joins sheet 1)
(Joins sheet 13)
(Joins sheet 22)
T. 29 N.
T. 28 N.
STEPHENSON COUNTY
water
North Branch
Otter Creek
South Branch
Otter Creek
31
32
33
6
5
4
7
8
9


13
R. 10 E.
(Joins sheet 2)
(Joins sheet 12)
(Joins sheet 14)
(Joins sheet 23)
T. 28 N. | T. 29 N.
720 000 FEET
2 110 000 FEET
2 105 000 FEET
735 000 FEET
N
1 Mile
5 000 Feet
Scale 1:15 840
North Branch
Otter Creek
South Branch
Durand
water
33
34
35
36
1
2
3
4
9
10
11
12

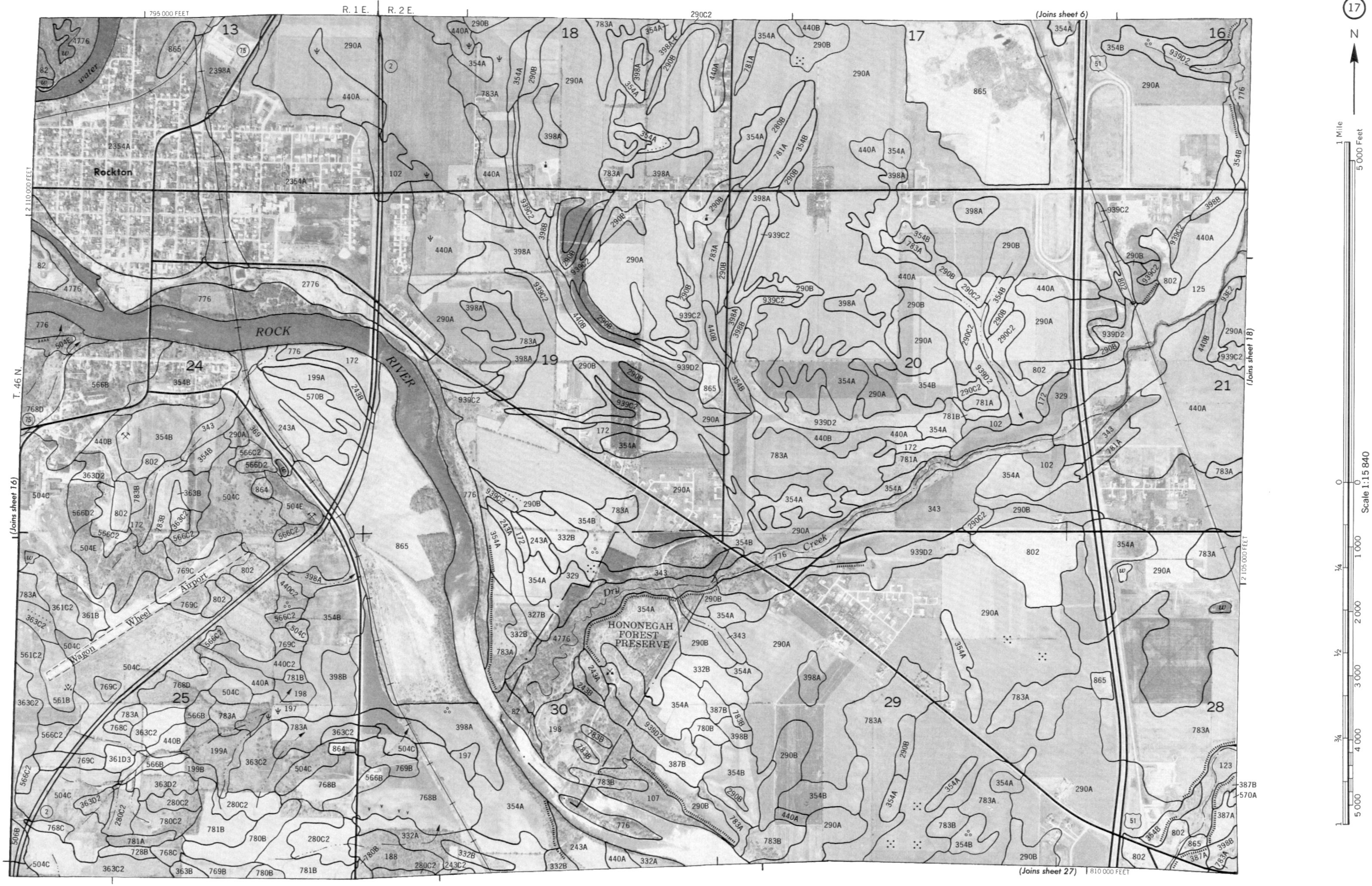
14

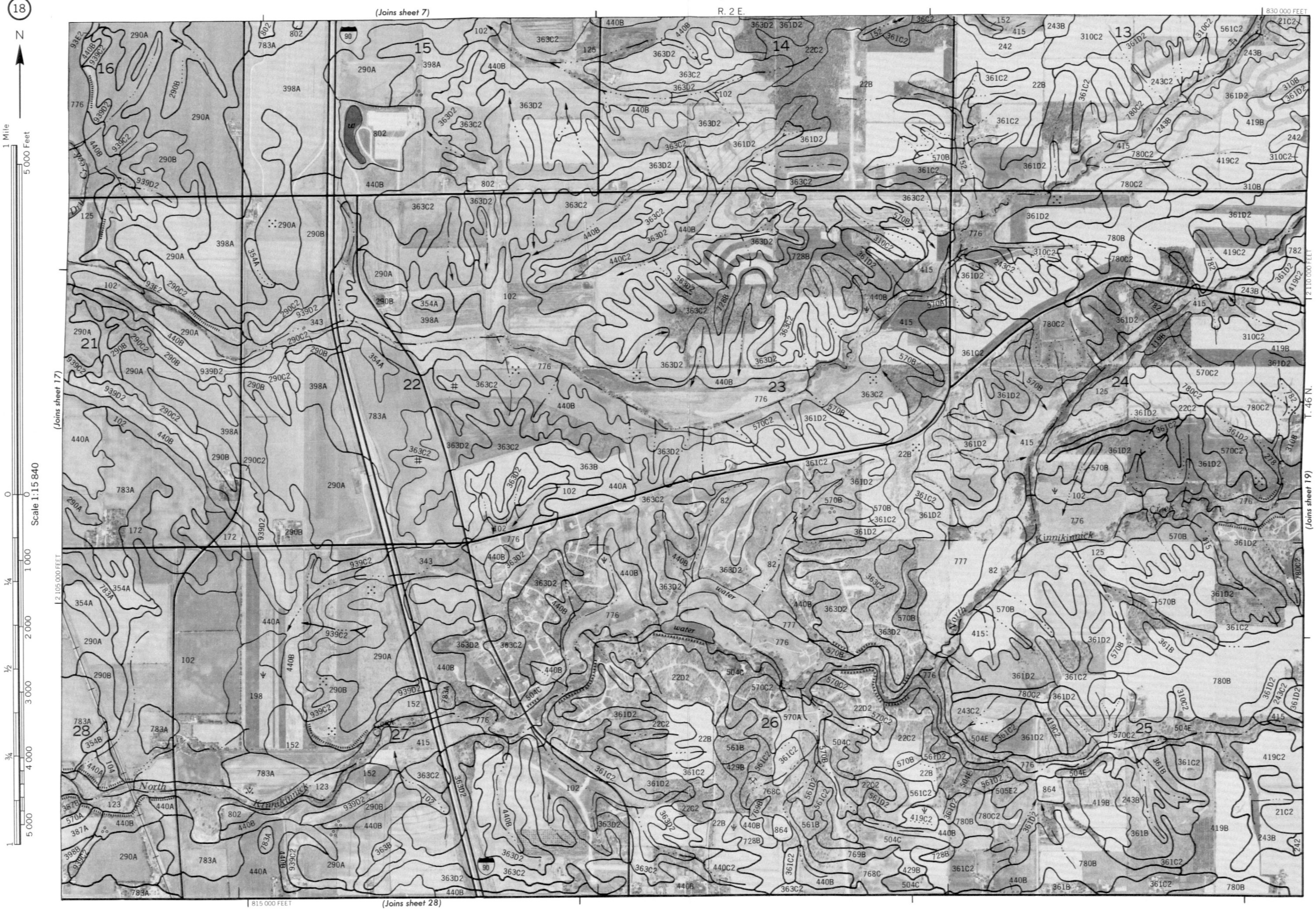
WINNEBAGO AND BOONE COUNTIES, ILLINOIS — SHEET NUMBER 14


15
(Joins sheet 4)
(Joins sheet 5)
(Joins sheet 16)
(Joins sheet 14)
(Joins sheet 25)
760 000 FEET
775 000 FEET
2 115 000 FEET
2 105 000 FEET
T. 29 N.
T. 28 N.
T. 46 N.
R. 11 E.
R. 1 E.
Shirland
PECATONICA
RIVER
PECATONICA RIVER
SUGAR
THIRD PRINCIPAL MERIDIAN
water
1 Mile
5 000 Feet
Scale 1:15 840

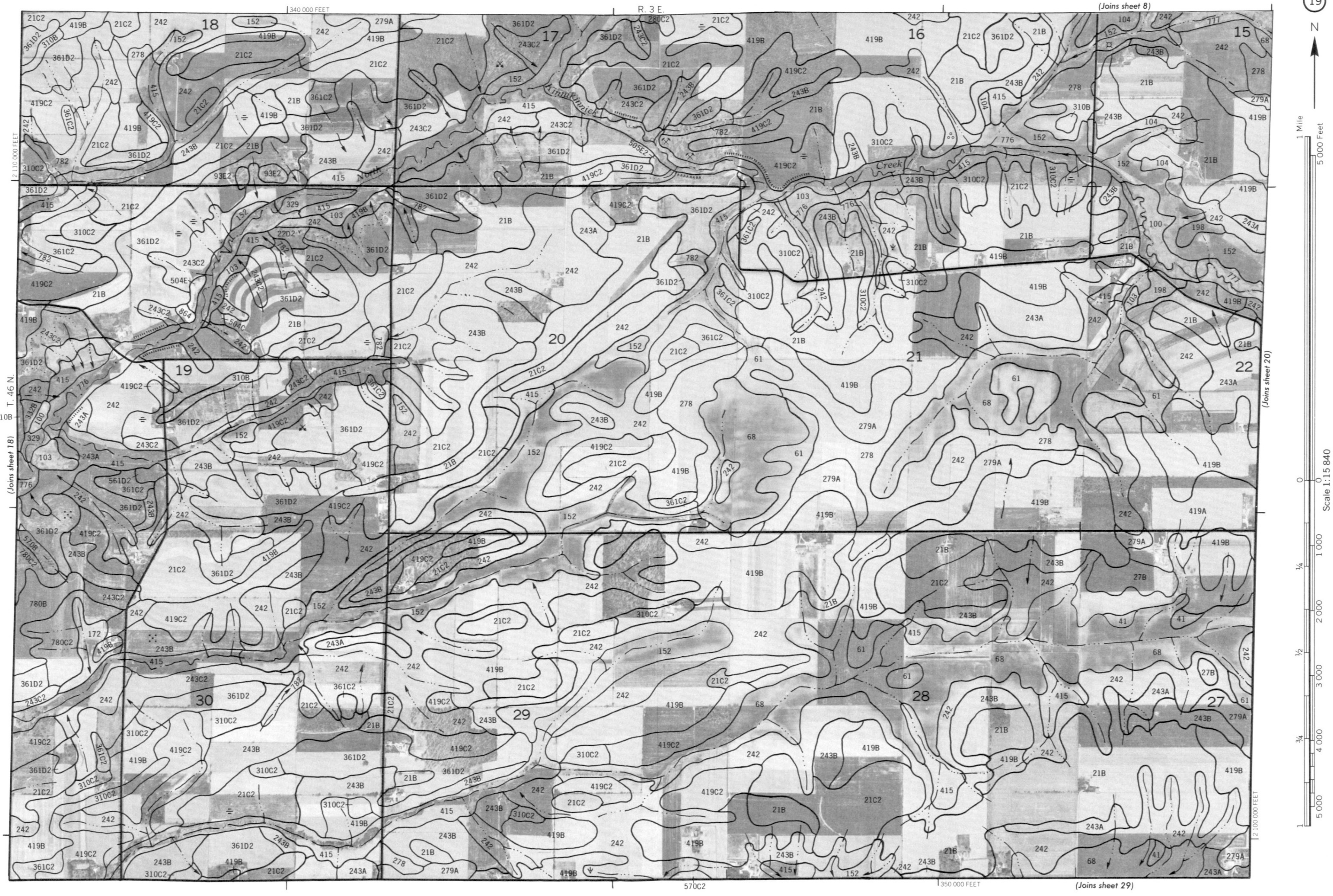
WINNEBAGO AND BOONE COUNTIES, ILLINOIS — SHEET NUMBER 16

WINNEBAGO AND BOONE COUNTIES, ILLINOIS — SHEET NUMBER 17

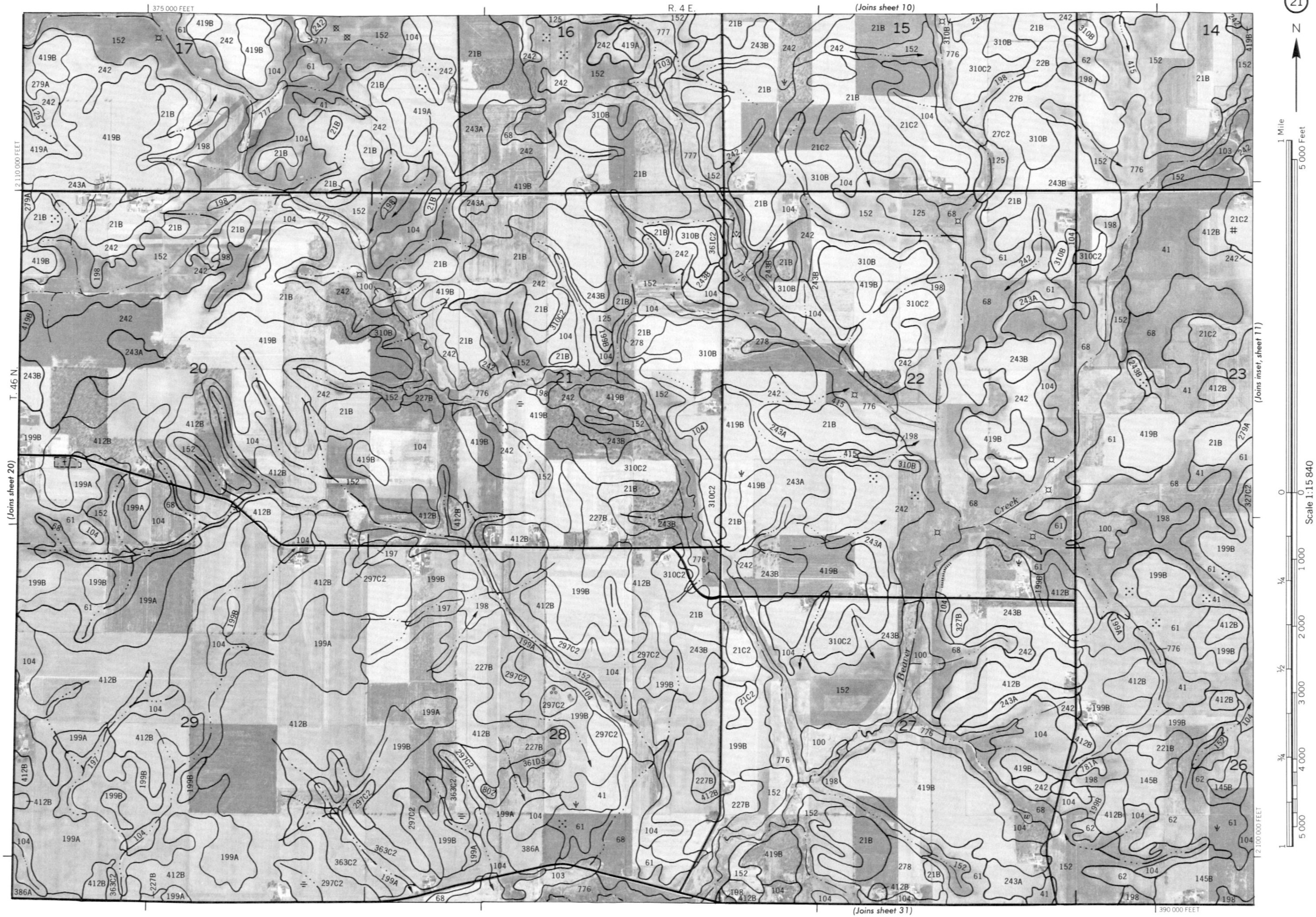



18
N
(Joins sheet 7)
R. 2 E.
830 000 FEET
(Joins sheet 17)
(Joins sheet 19)
T. 46 N.
2 110 000 FEET
2 105 000 FEET
815 000 FEET
(Joins sheet 28)
1 Mile
5 000 Feet
Scale 1:15 840
North Kinnikinnick
Kinnikinnick Creek
Dry Creek

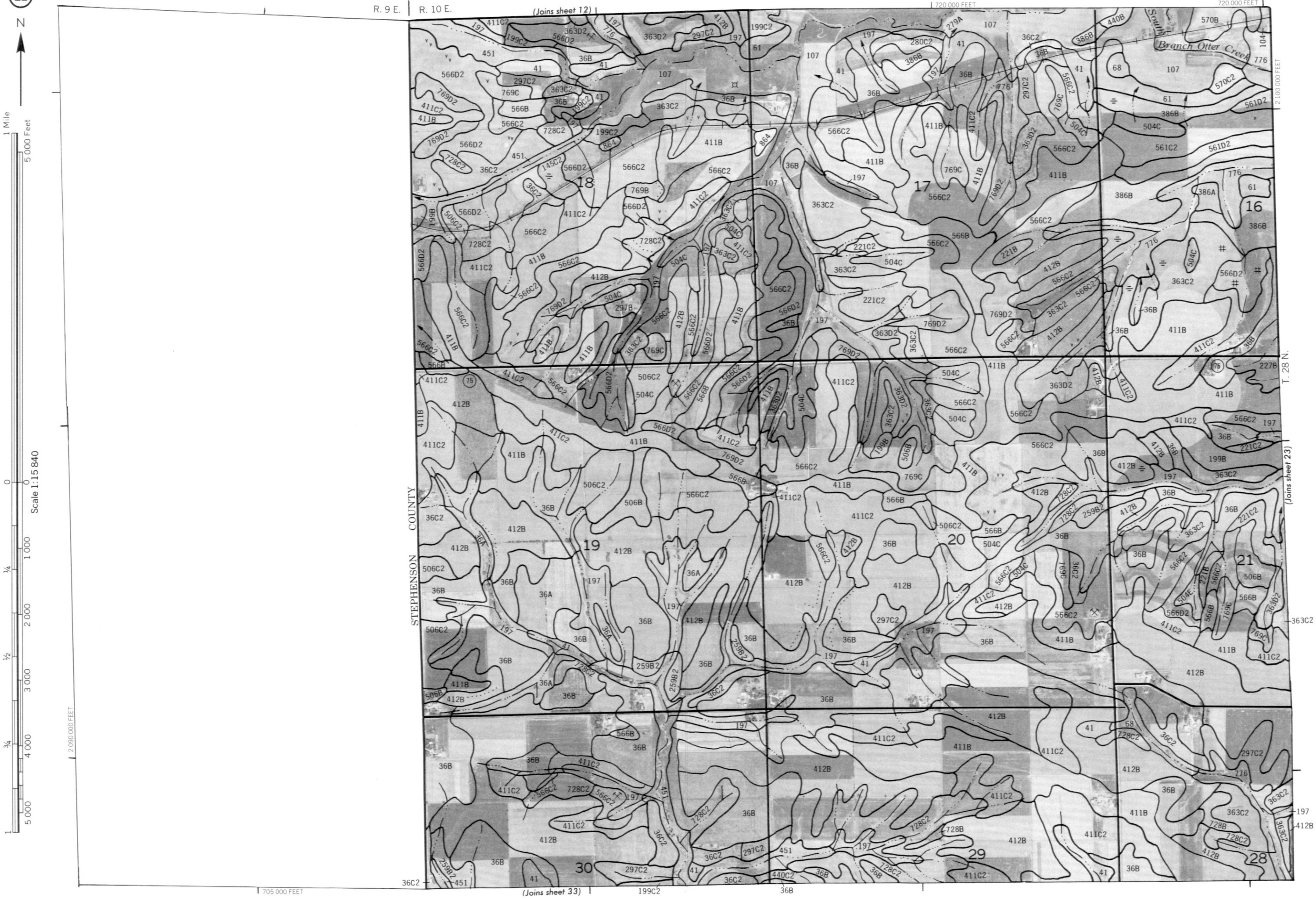
WINNEBAGO AND BOONE COUNTIES, ILLINOIS — SHEET NUMBER 19

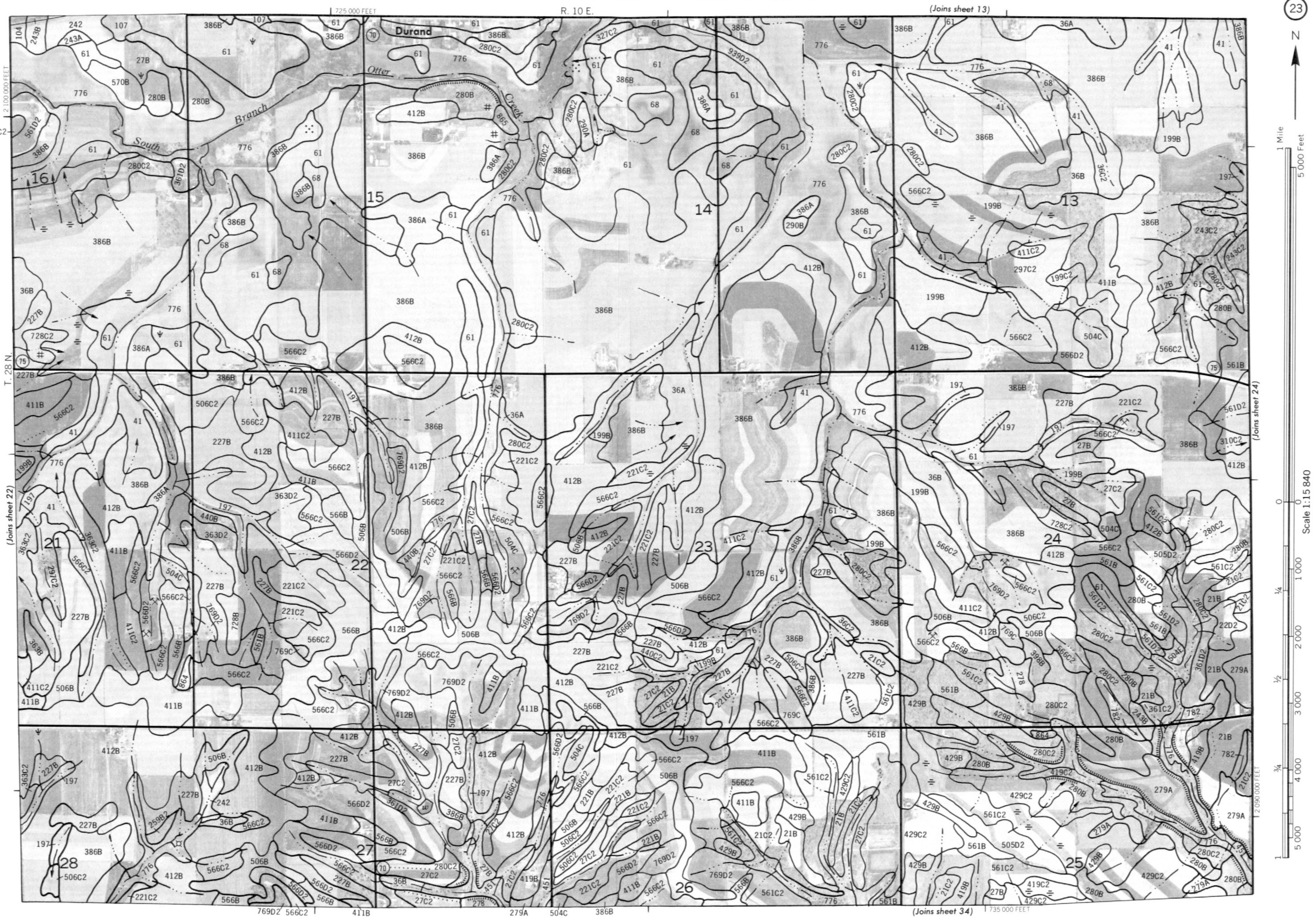


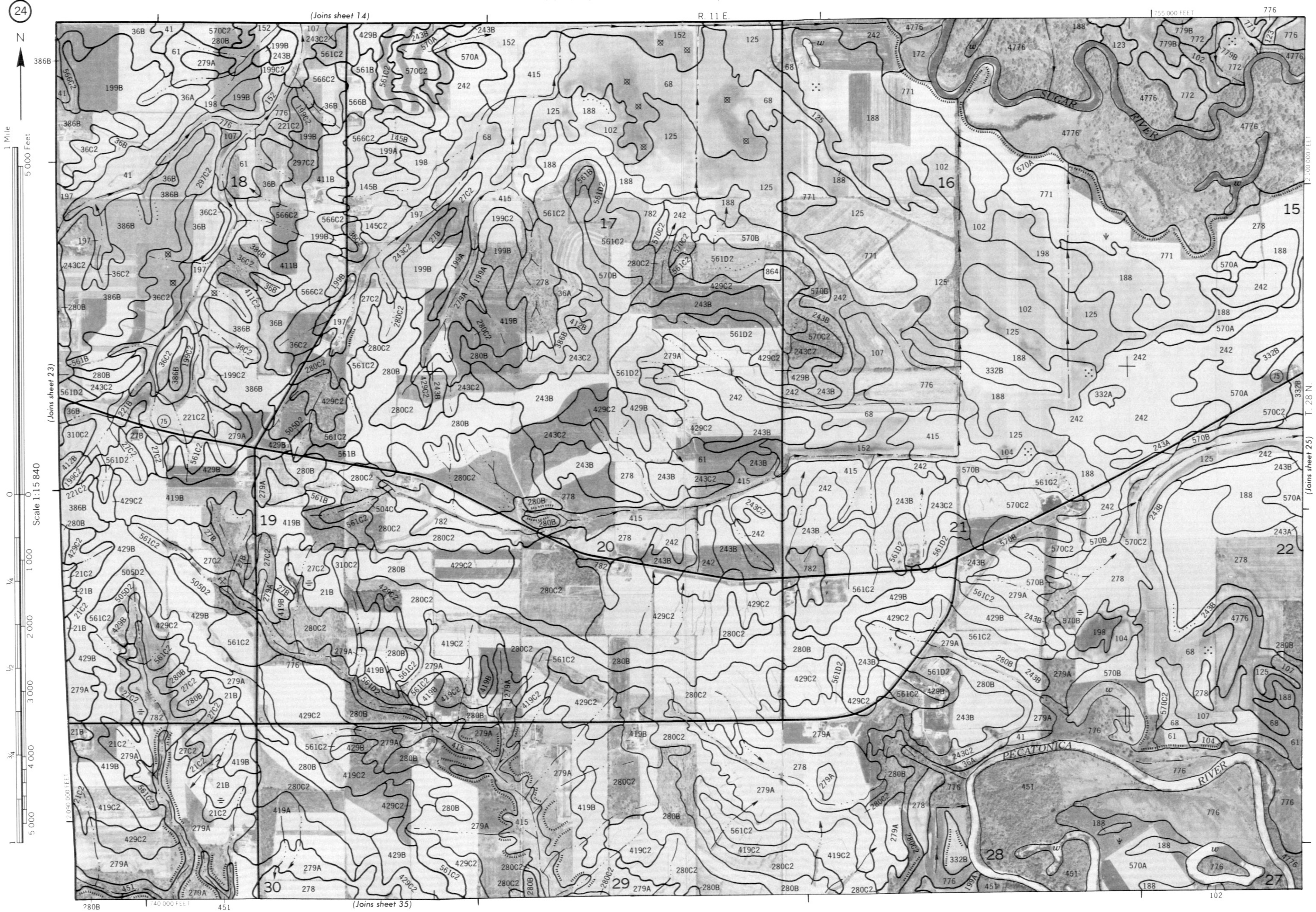

N
(Joins sheet 9)
(Joins sheet 19)
(Joins sheet 21)
(Joins sheet 30)
R. 3 E.
R. 4 E.
T. 46 N.
370 000 FEET
2 010 000 FEET
355 000 FEET
North Kinnikinnick Creek
South Kinnikinnick Creek
Blaine
15
14
13
18
22
23
24
19
27
26
25
30
1 Mile
5 000 Feet
Scale 1:15 840


21
375 000 FEET
R. 4 E.
(Joins sheet 10)
2 110 000 FEET
T. 46 N.
(Joins sheet 20)
(Joins inset, sheet 11)
(Joins sheet 31)
2 100 000 FEET
390 000 FEET
N
1 Mile
5 000 Feet
Scale 1:15 840
Beaver
Creek
14
15
16
17
20
21
22
23
26
27
28
29

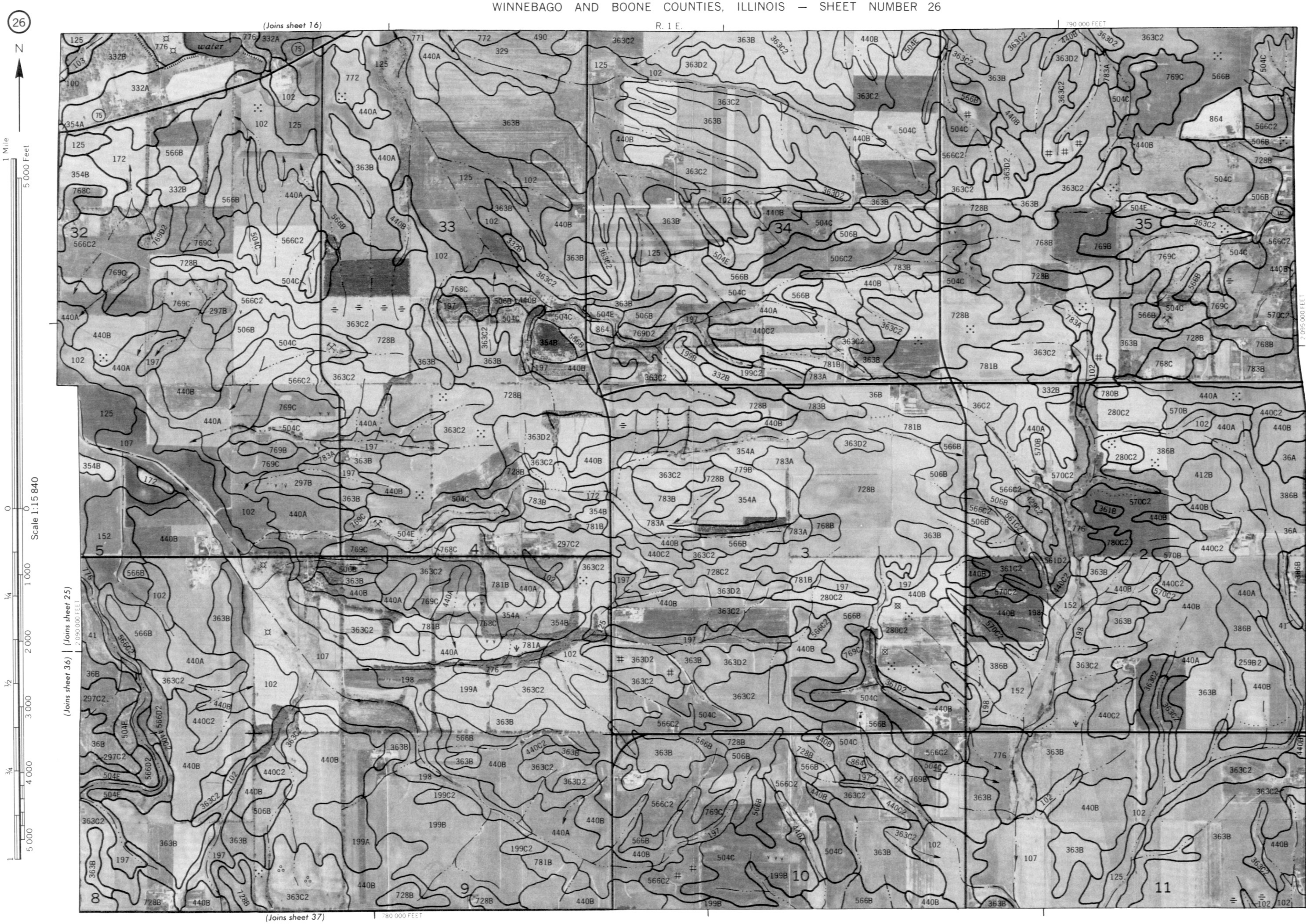
WINNEBAGO AND BOONE COUNTIES, ILLINOIS — SHEET NUMBER 22



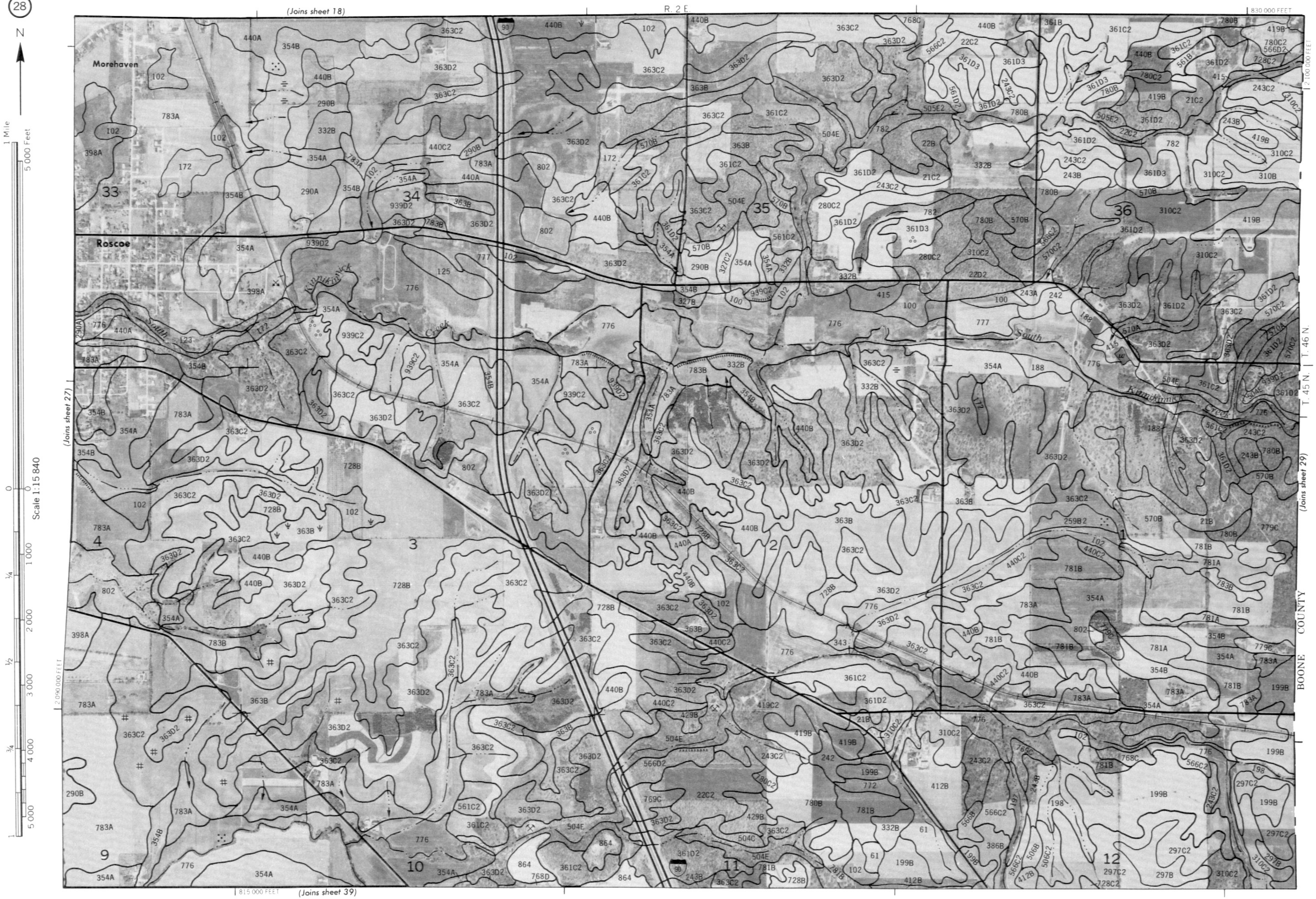

23
N
(Joins sheet 13)
(Joins sheet 24)
(Joins sheet 22)
(Joins sheet 34)
R. 10 E.
T. 28 N.
725 000 FEET
735 000 FEET
2 100 000 FEET
2 090 000 FEET
Durand
Otter Creek
South Branch
1 Mile
5 000 Feet
Scale 1:15 840

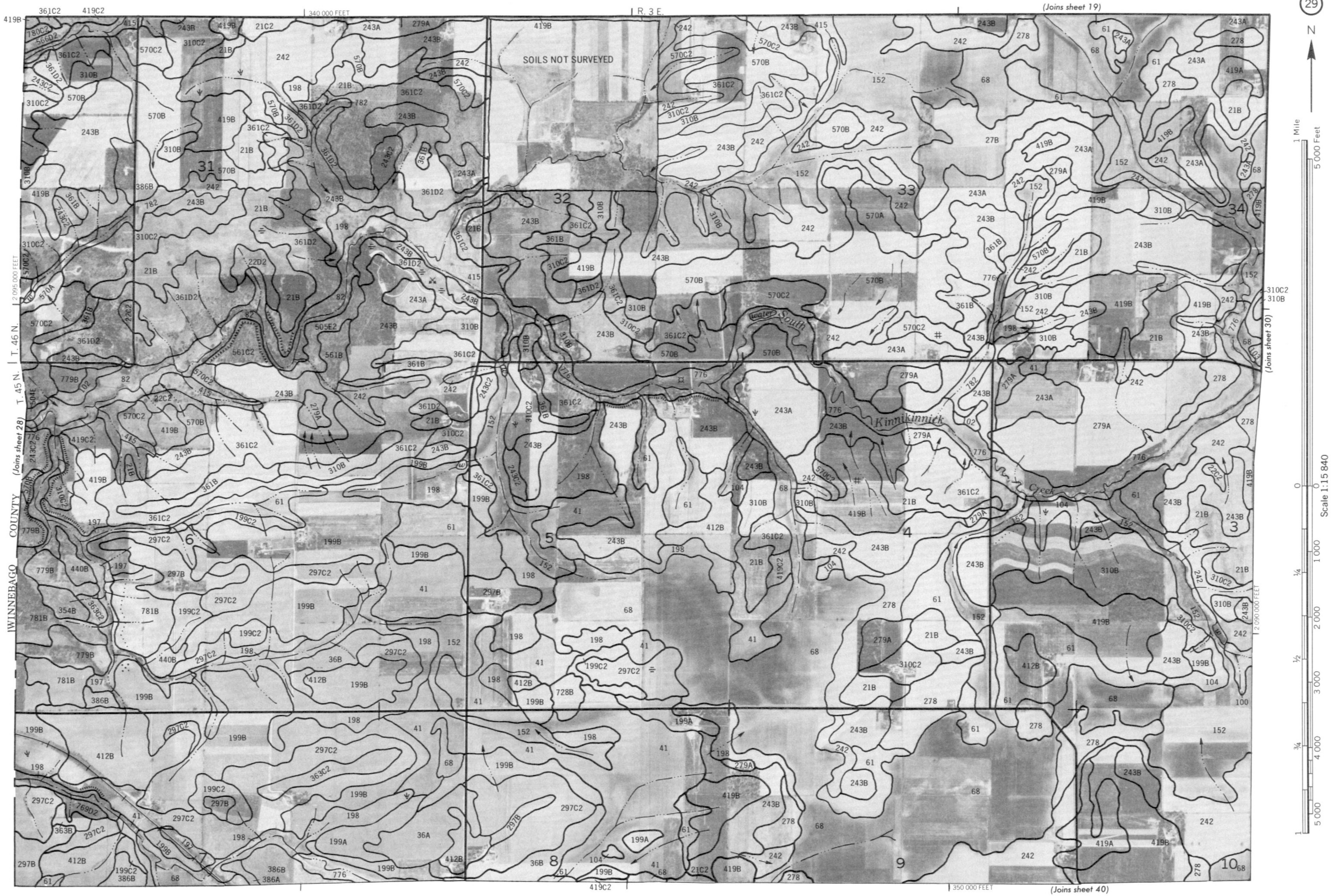

24
(Joins sheet 14)
(Joins sheet 23)
(Joins sheet 25)
(Joins sheet 35)
R. 11 E.
T. 28 N.
N
1 Mile
5 000 Feet
Scale 1:15 840
SUGAR RIVER
PECATONICA RIVER

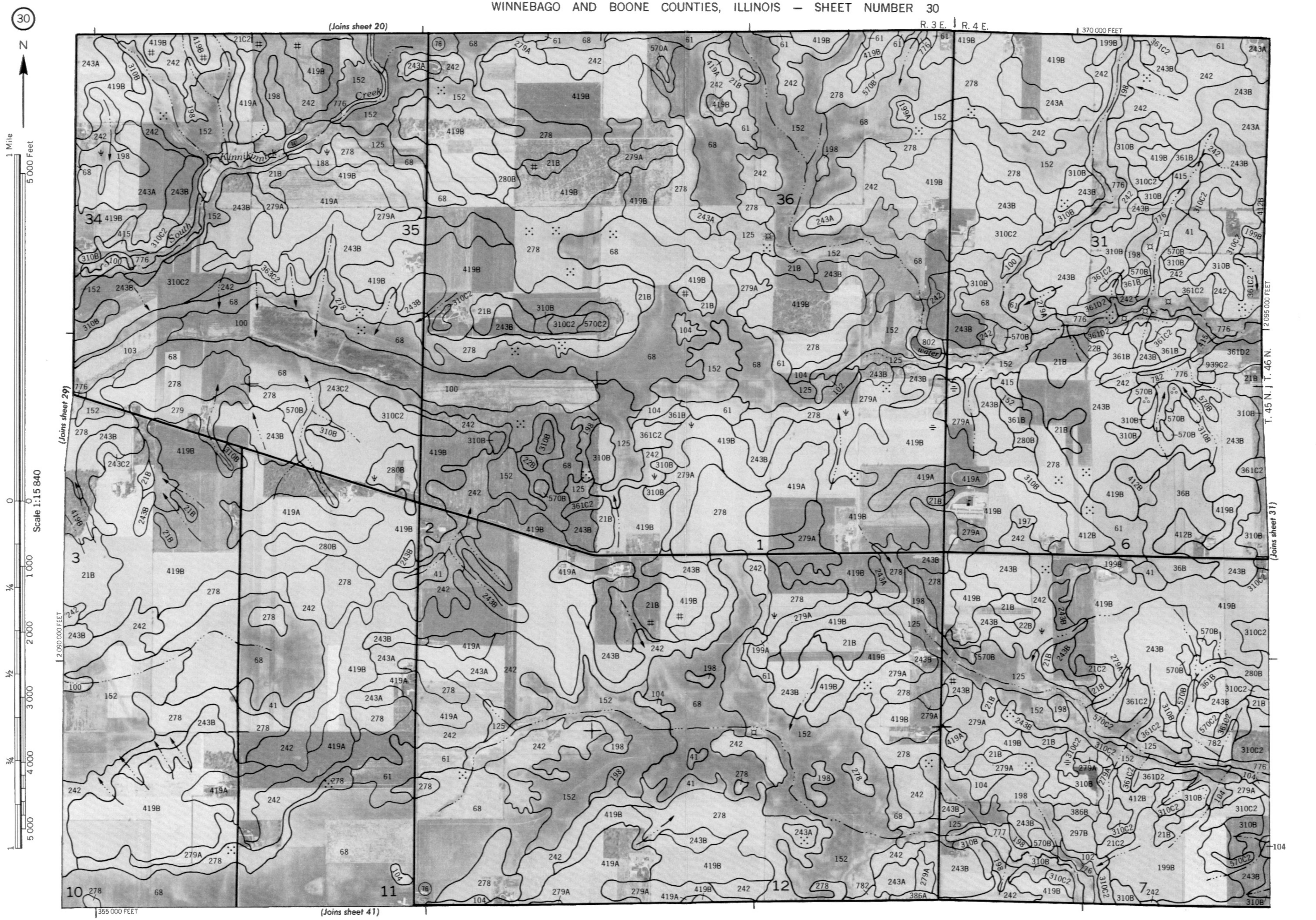

25
(Joins sheet 15)
(Joins sheet 16)
(Joins sheet 26)
(Joins sheet 24)
(Joins sheet 36)
R. 11 E.
R. 1 E.
THIRD PRINCIPAL MERIDIAN
T. 28 N.
T. 46 N.
T. 45 N.
Harrison
SUGAR RIVER
PECATONICA RIVER
water
760 000 FEET
775 000 FEET
2 100 000 FEET
2 095 000 FEET
N
1 Mile
5 000 Feet
Scale 1:15 840

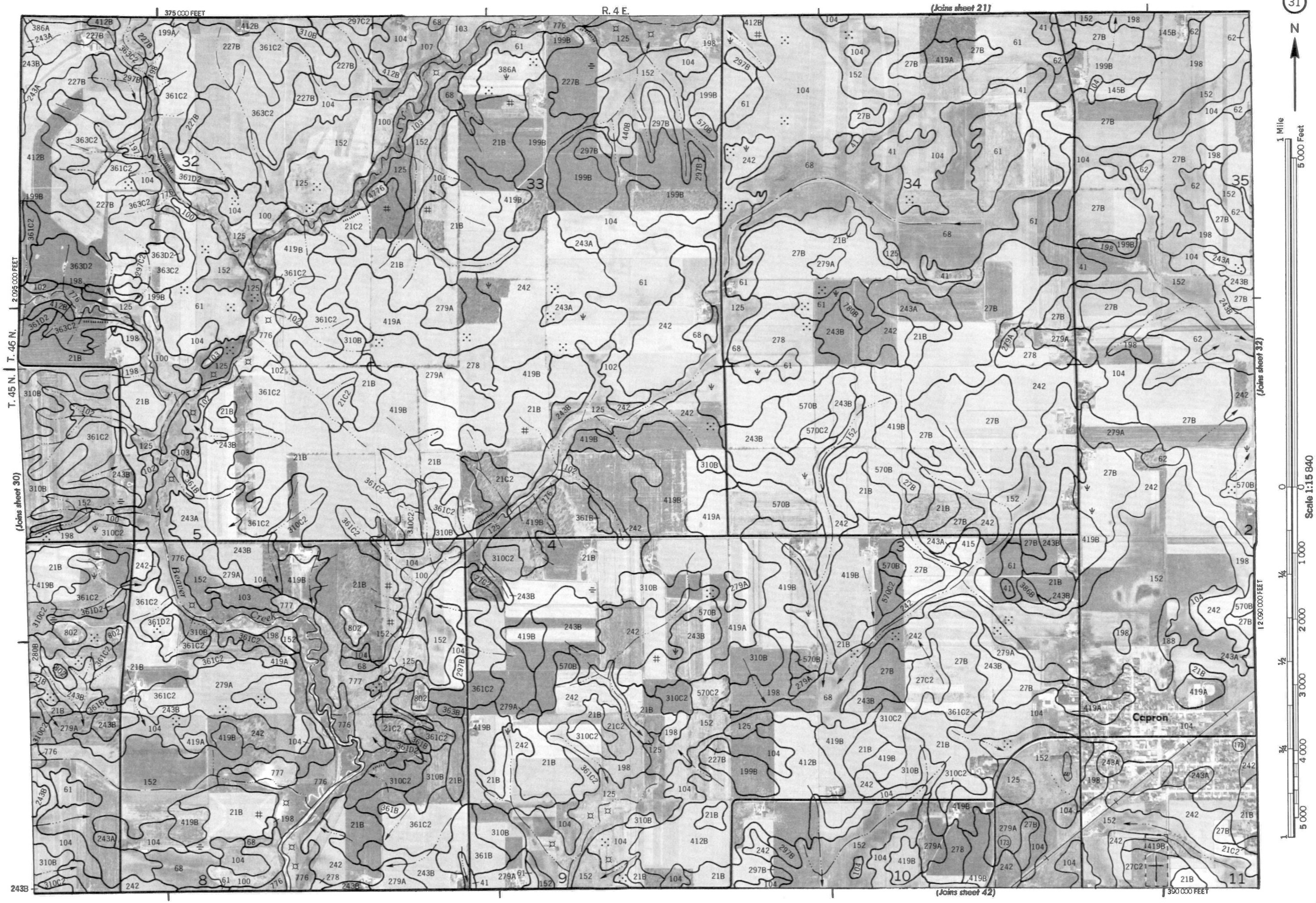

26
N
(Joins sheet 16)
R. 1 E.
790 000 FEET
water
T. 46 N.
T. 45 N.
2 095 000 FEET
(Joins sheet 27)
(Joins sheet 25)
(Joins sheet 36)
2 090 000 FEET
(Joins sheet 37)
780 000 FEET
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾
1
32
33
34
35
5
4
3
2
8
9
10
11

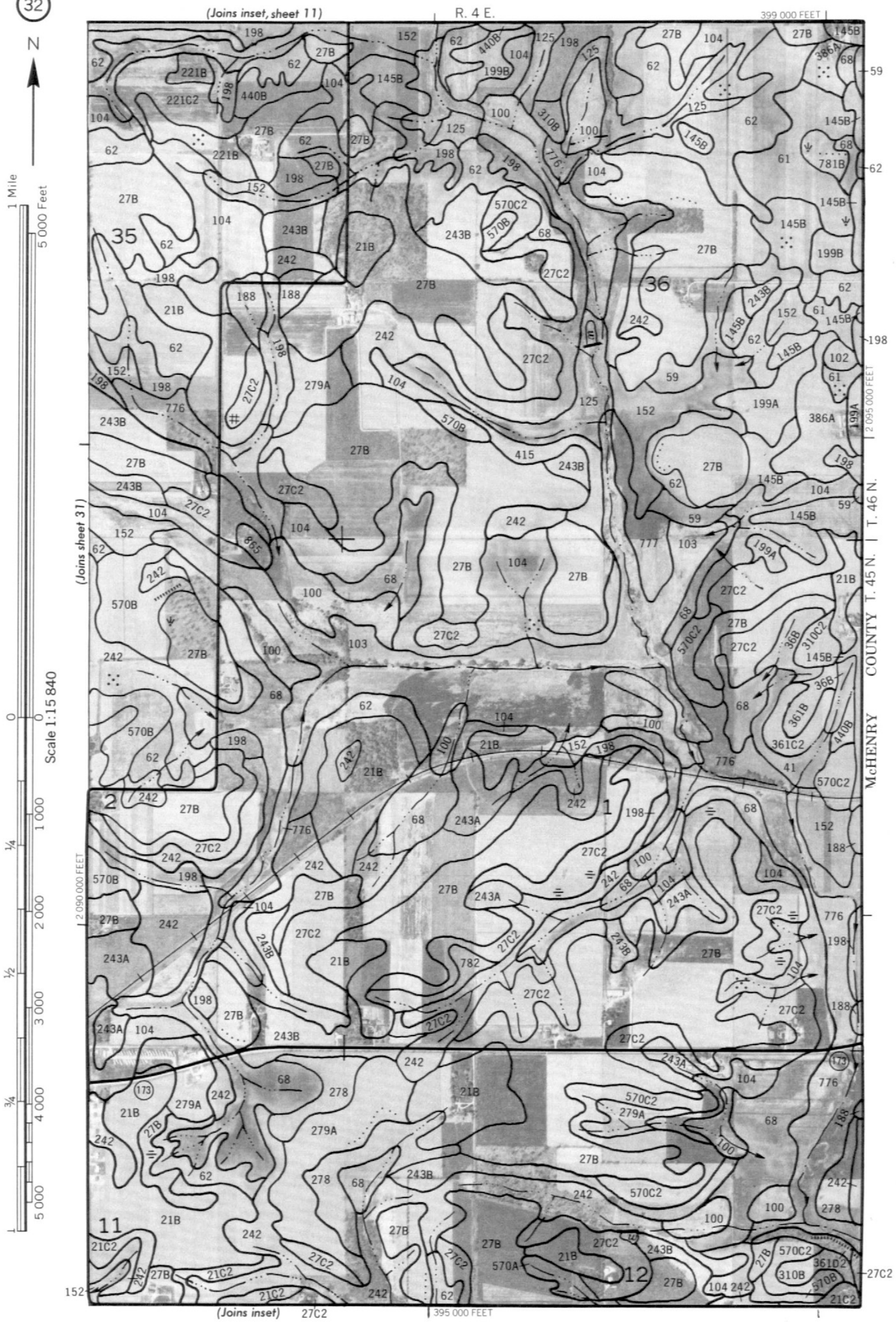

795 000 FEET
R. 1 E. | R. 2 E.
(Joins sheet 17)
N
(Joins sheet 26)
(Joins sheet 28)
(Joins sheet 38)
2 095 000 FEET
2 090 000 FEET
810 000 FEET
T. 45 N. | T. 46 N.
ROCK RIVER
ROCK RIVER
Riverdale
Morehaven
Roscoe
ATWOOD HOMESTEAD FOREST PRESERVE
51
51
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
1/4
1/2
3/4
1
36
31
32
33
1
6
5
4
12
7
8
9

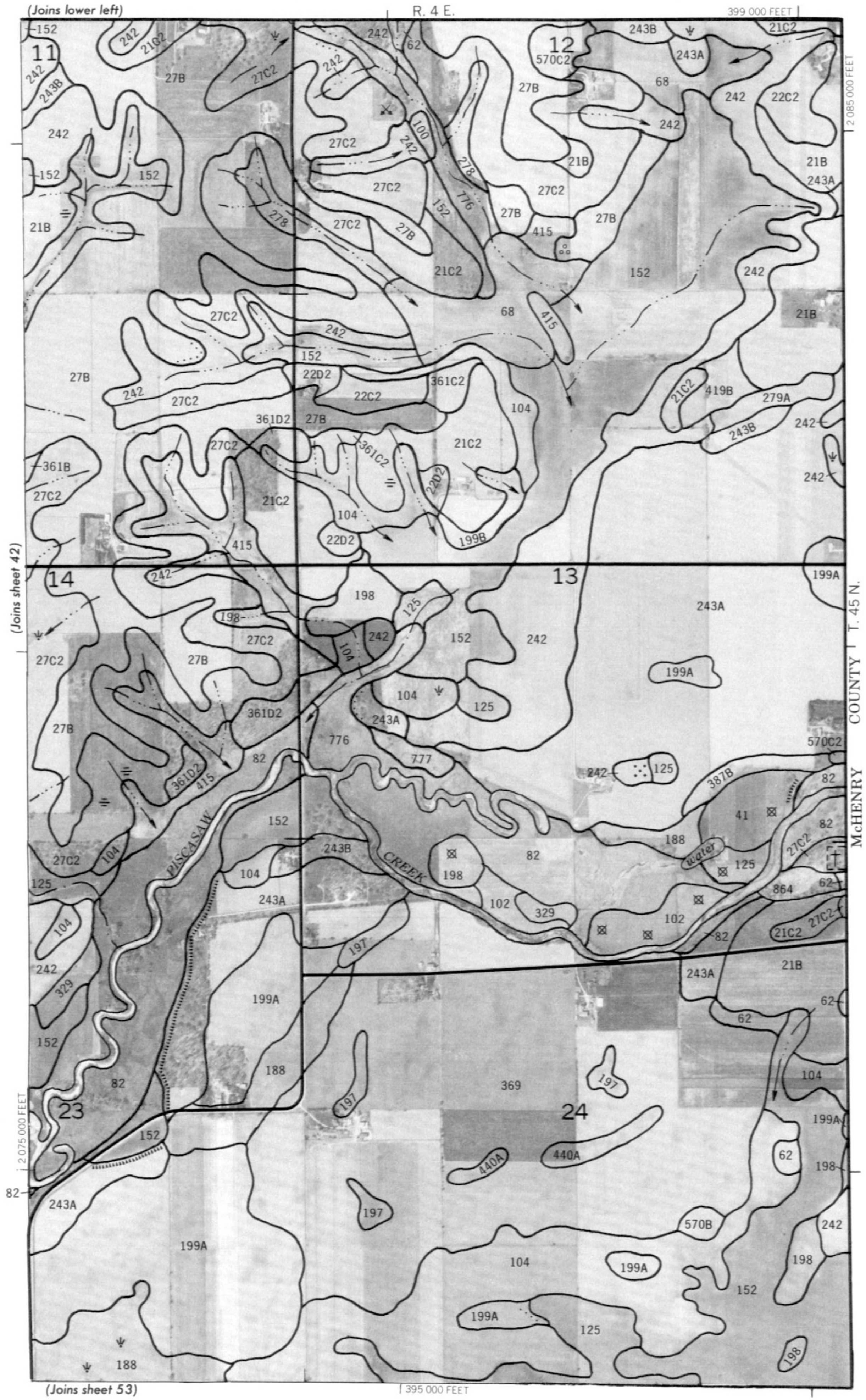

N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 18)
R. 2 E.
830 000 FEET
2 100 000 FEET
Morehaven
Roscoe
Kinnikinnick
South
Creek
(Joins sheet 27)
(Joins sheet 29)
T. 46 N.
T. 45 N.
BOONE COUNTY
2 090 000 FEET
815 000 FEET
(Joins sheet 39)

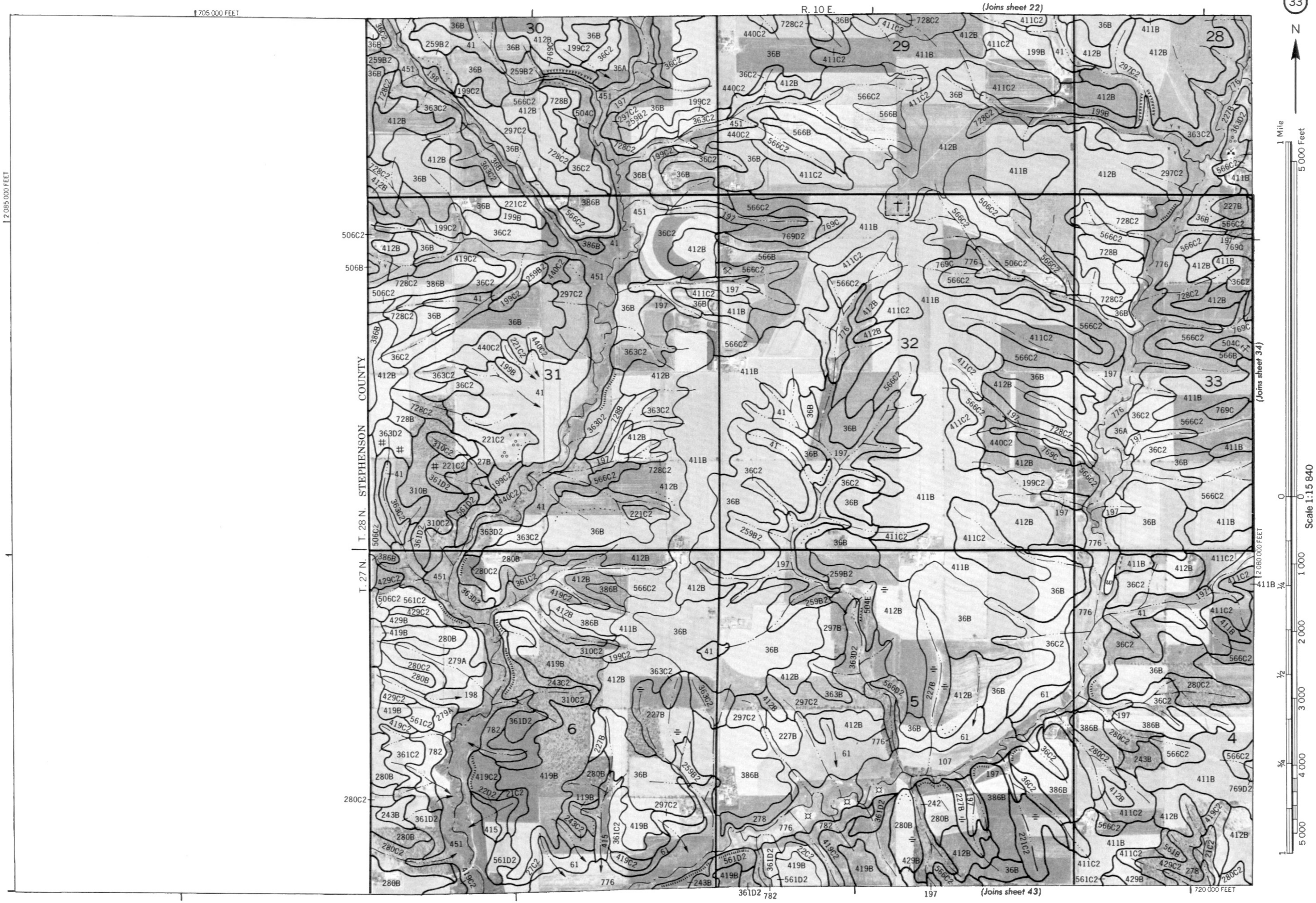

29
N
(Joins sheet 19)
(Joins sheet 30)
(Joins sheet 40)
(Joins sheet 28)
R. 3 E.
T. 46 N.
T. 45 N.
340 000 FEET
350 000 FEET
2 095 000 FEET
2 090 000 FEET
SOILS NOT SURVEYED
WINNEBAGO COUNTY
Kinnikinnick Creek
South
water
1 Mile
5 000 Feet
Scale 1:15 840
31
32
33
34
6
5
4
3
7
8
9
10

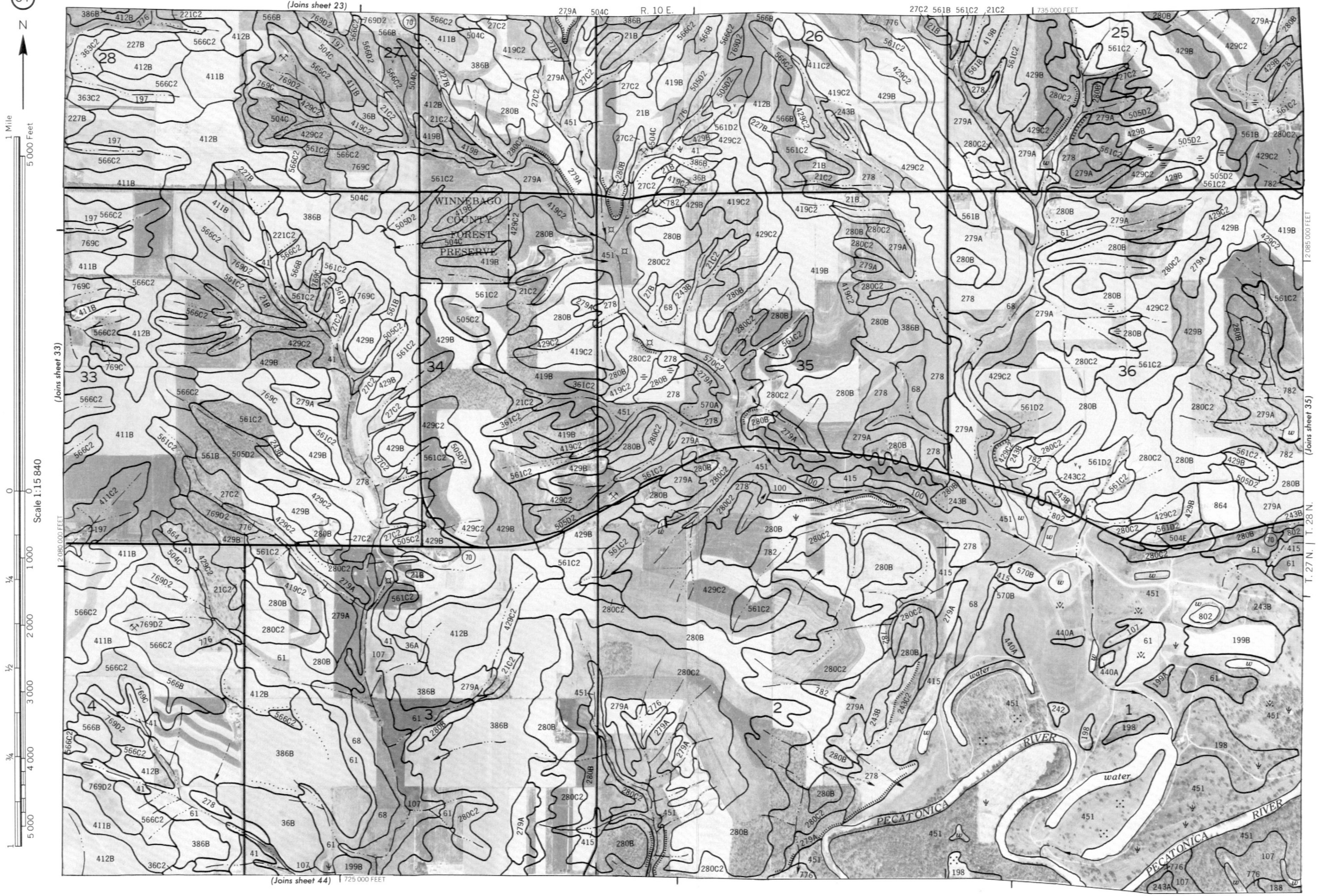

N
(Joins sheet 20)
(Joins sheet 29)
(Joins sheet 31)
(Joins sheet 41)
R. 3 E. | R. 4 E.
T. 45 N. | T. 46 N.
370 000 FEET
355 000 FEET
2 095 000 FEET
2 090 000 FEET
Scale 1:15 840
1 Mile
5 000 Feet
Kinnikinnick
South
Creek
water

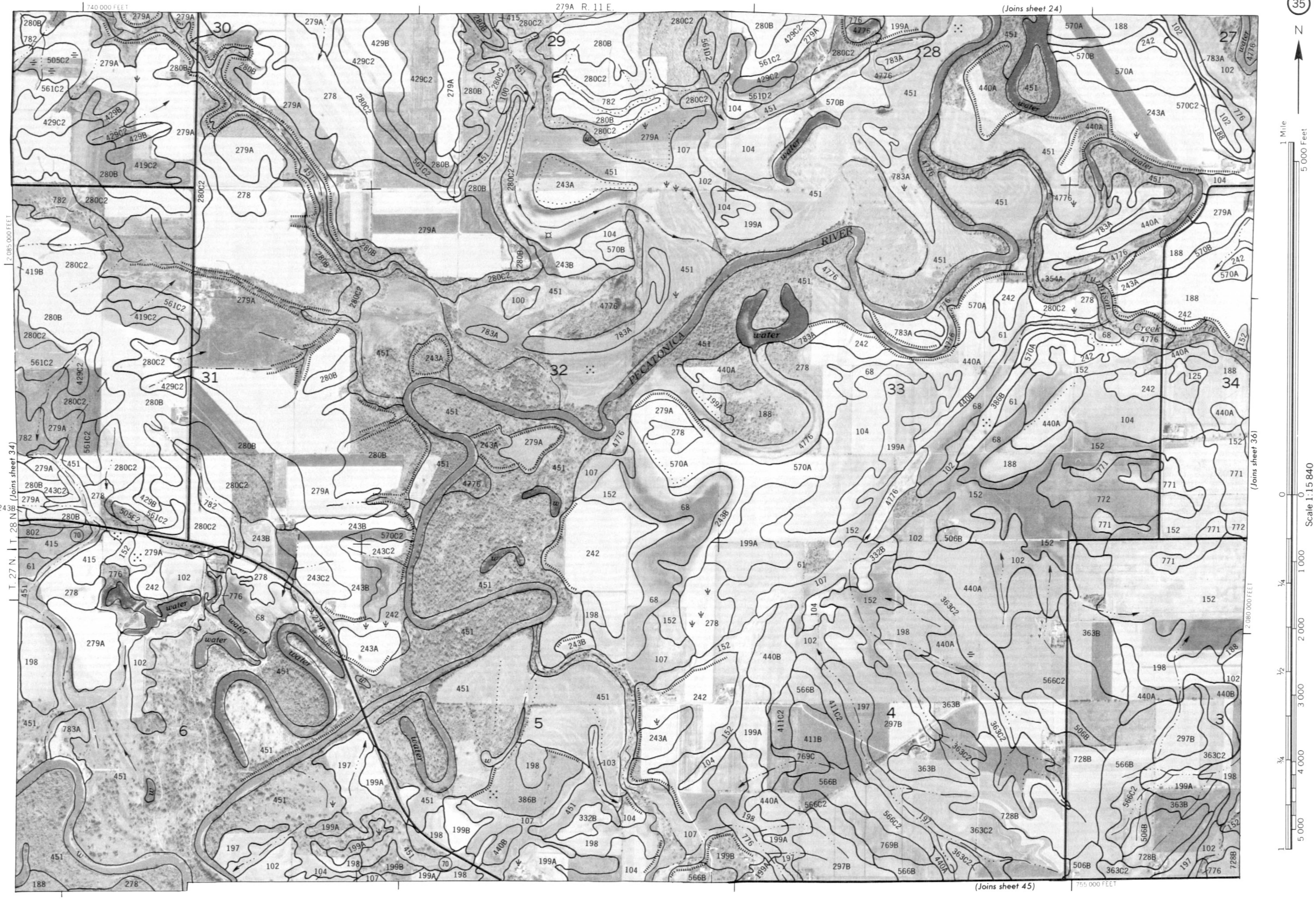

375 000 FEET
R. 4 E.
(Joins sheet 21)
N
(Joins sheet 32)
(Joins sheet 42)
(Joins sheet 30)
T. 46 N.
T. 45 N.
2 095 000 FEET
2 090 000 FEET
390 000 FEET
Beaver Creek
Capron
1 Mile
5 000 Feet
Scale 1:15 840

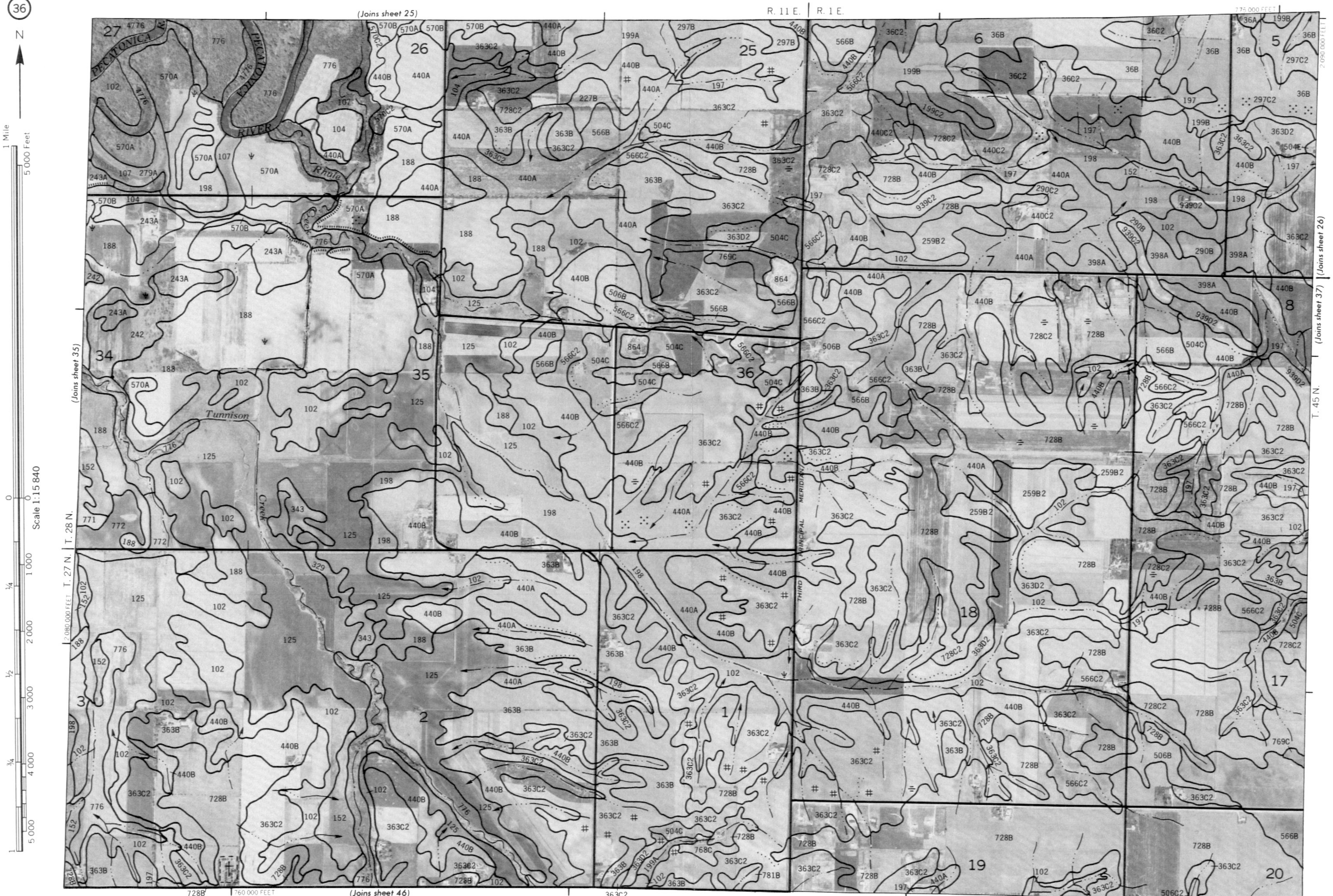

N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins inset, sheet 11)
R. 4 E.
399 000 FEET
(Joins sheet 31)
T. 46 N.
T. 45 N.
McHENRY COUNTY
2 095 000 FEET
2 090 000 FEET
(Joins inset)
395 000 FEET
35
36
2
1
11
12
PISCASAW

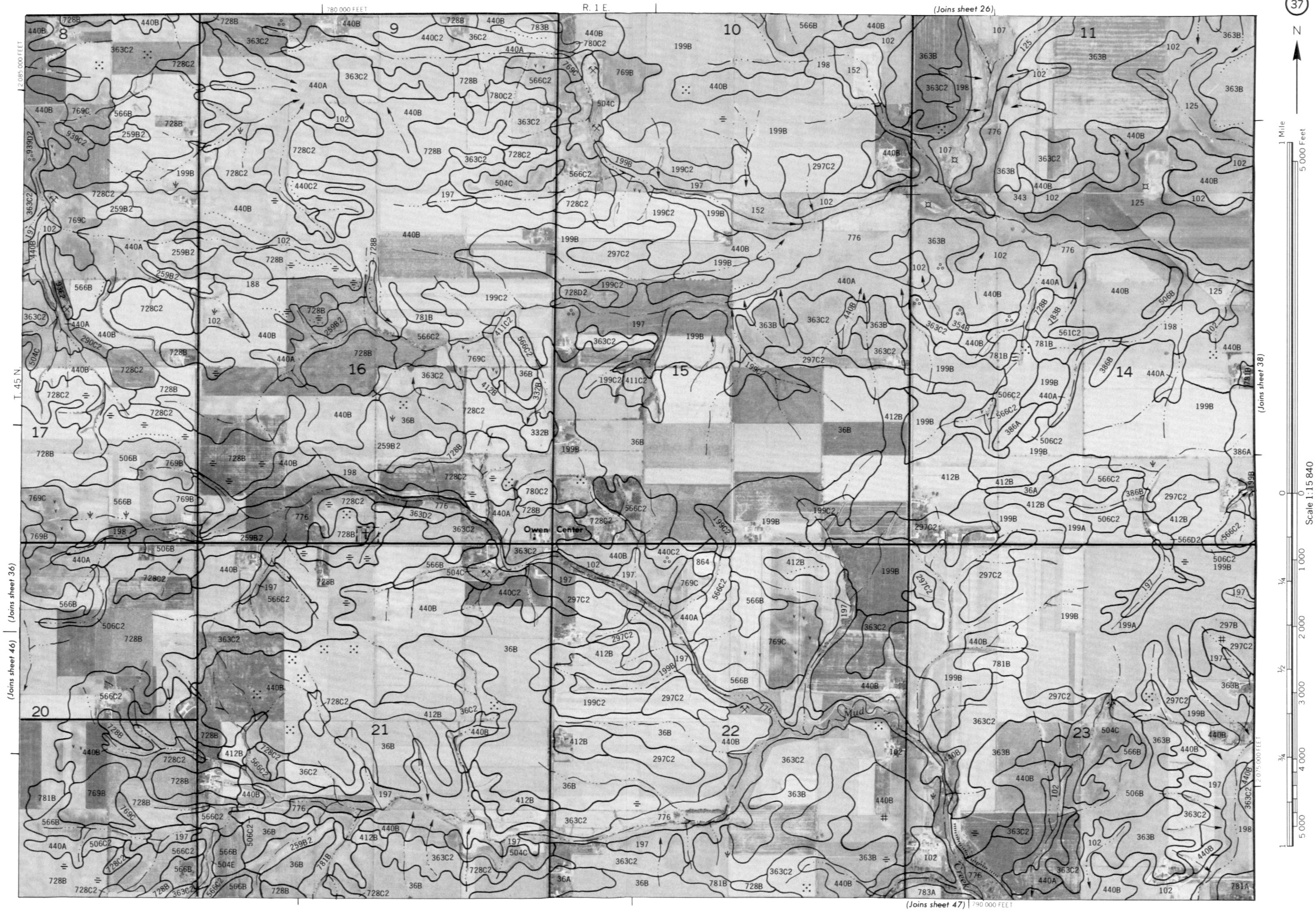

(Joins lower left)
R. 4 E.
399 000 FEET
2 085 000 FEET
(Joins sheet 42)
T. 45 N.
McHENRY COUNTY
2 075 000 FEET
(Joins sheet 53)
395 000 FEET
11
12
14
13
23
24
PISCASAW
CREEK
Water

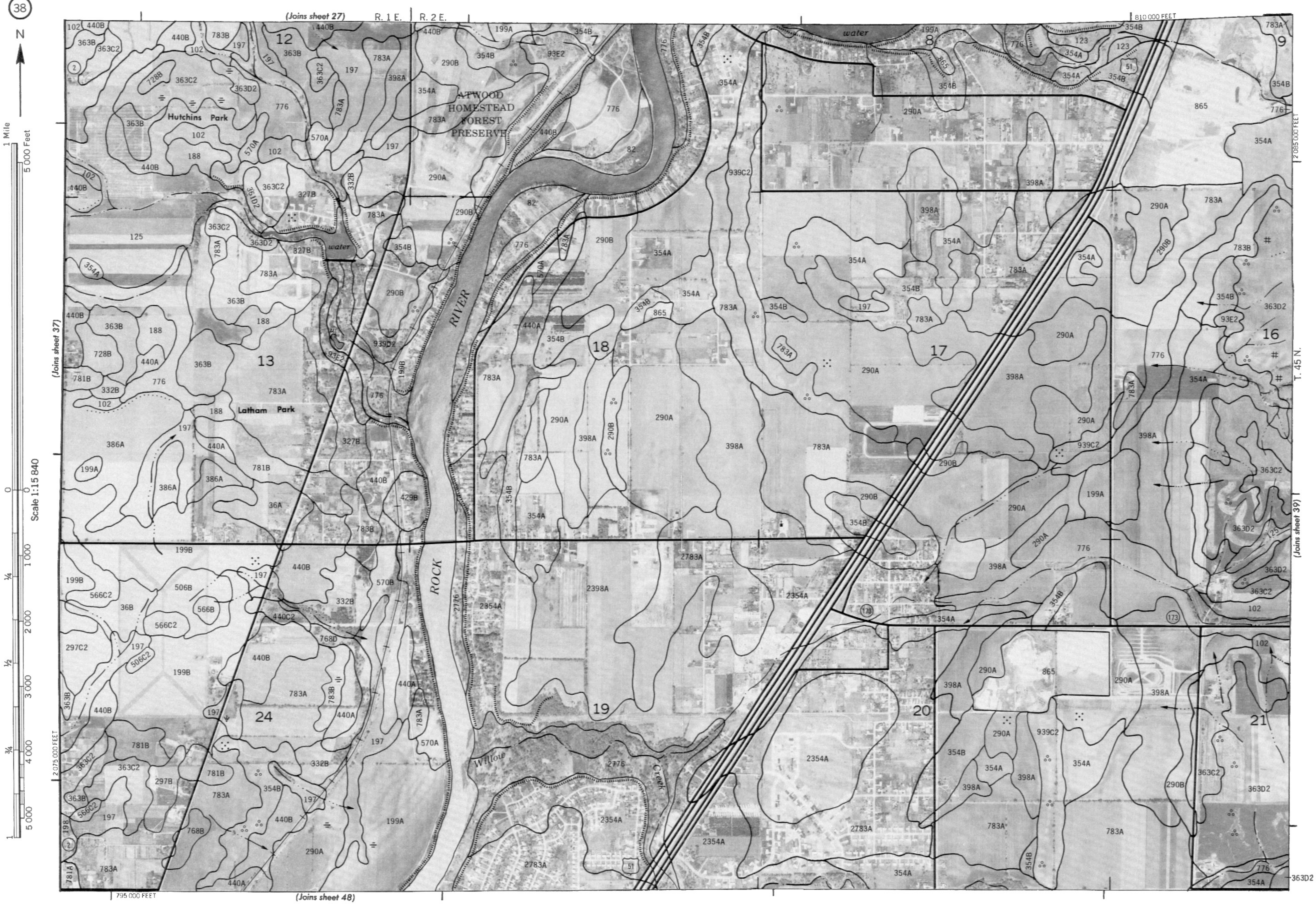

33
705 000 FEET
R. 10 E.
(Joins sheet 22)
(Joins sheet 34)
(Joins sheet 43)
2 085 000 FEET
2 080 000 FEET
720 000 FEET
STEPHENSON COUNTY
T. 28 N.
T. 27 N.
N
1 Mile
5 000 Feet
Scale 1:15 840
30
29
28
31
32
33
6
5
4


N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 23)
(Joins sheet 33)
(Joins sheet 35)
(Joins sheet 44)
R. 10 E.
T. 28 N.
T. 27 N.
735 000 FEET
725 000 FEET
2 085 000 FEET
2 080 000 FEET
WINNEBAGO COUNTY FOREST PRESERVE
PECATONICA RIVER
water

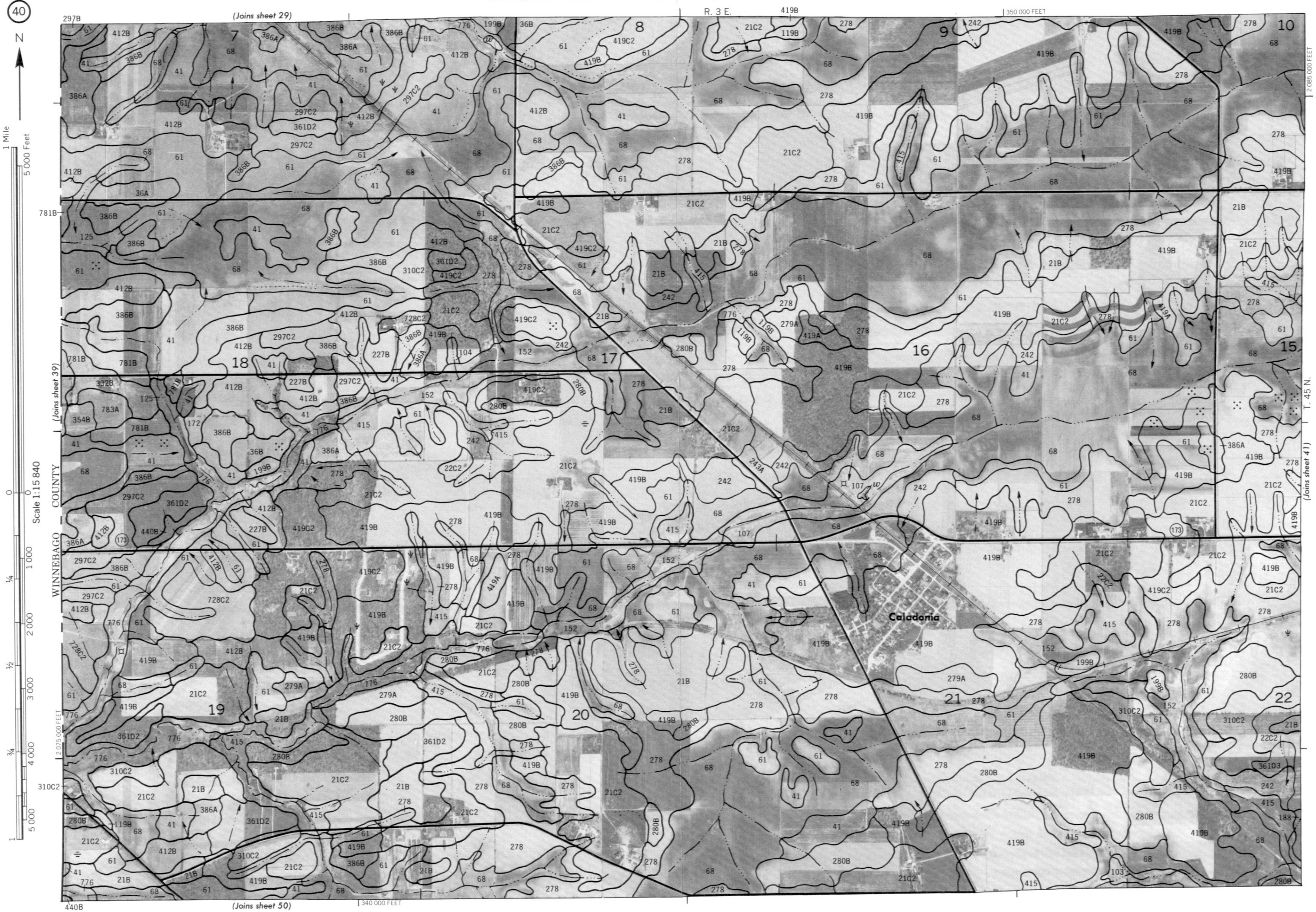

35
N
(Joins sheet 24)
(Joins sheet 34)
(Joins sheet 36)
(Joins sheet 45)
740 000 FEET
755 000 FEET
2 085 000 FEET
2 080 000 FEET
R. 11 E.
T. 28 N.
T. 27 N.
PECATONICA
RIVER
Turtle
Creek
water
1 Mile
5 000 Feet
Scale 1:15 840

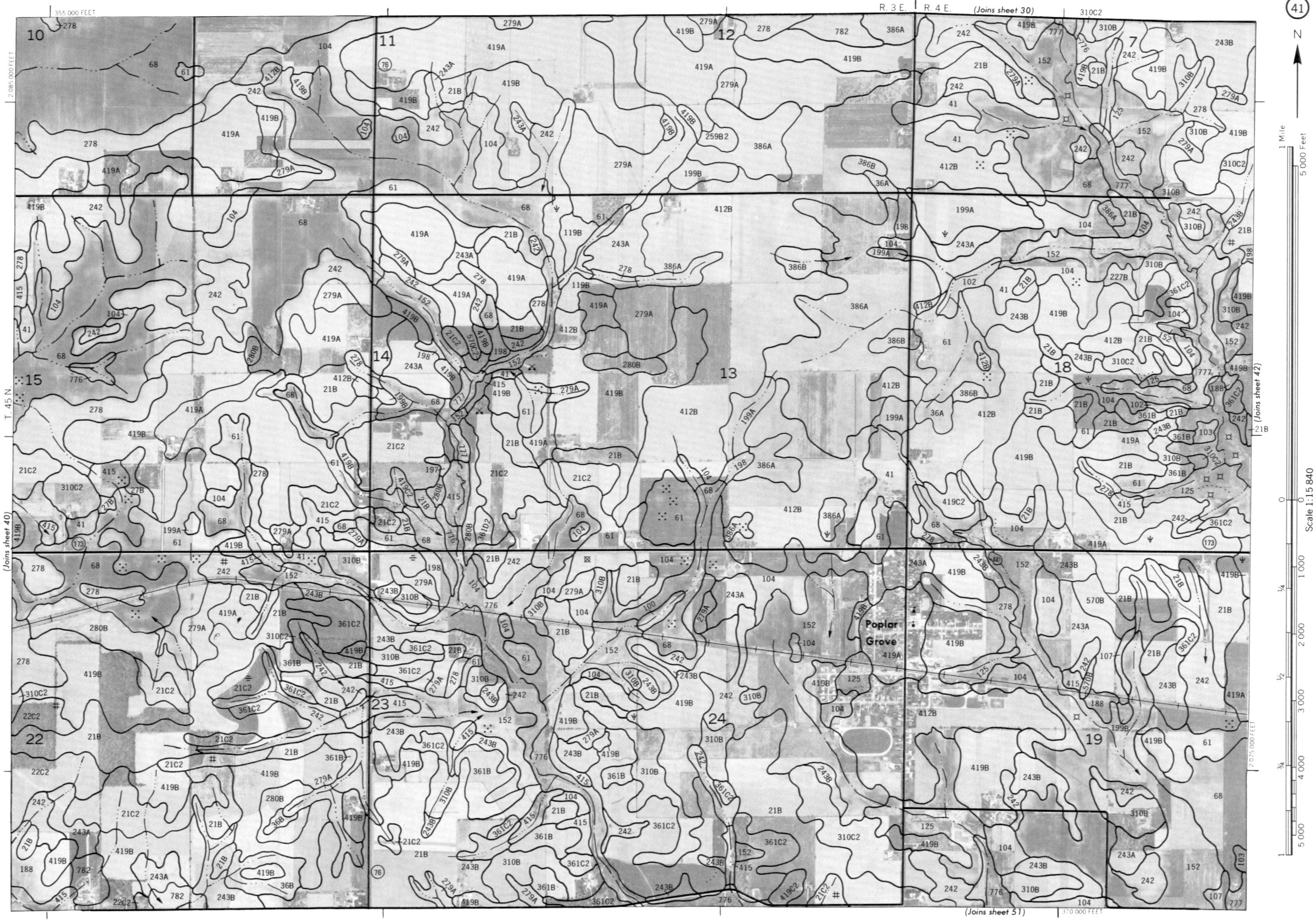

36
N
(Joins sheet 25)
(Joins sheet 26)
(Joins sheet 37)
(Joins sheet 35)
(Joins sheet 46)
R. 11 E. | R. 1 E.
T. 28 N.
T. 27 N.
T. 45 N.
PECATONICA RIVER
Rhula Creek
Tunnison Creek
THIRD PRINCIPAL MERIDIAN
1 Mile
5 000 Feet
Scale 1:15 840
775 000 FEET
2 090 000 FEET
2 080 000 FEET
760 000 FEET


37
780 000 FEET
R. 1 E.
(Joins sheet 26)
N
T. 45 N.
(Joins sheet 36)
(Joins sheet 46)
(Joins sheet 38)
(Joins sheet 47)
790 000 FEET
2 085 000 FEET
2 075 000 FEET
8
9
10
11
14
15
16
17
20
21
22
23
Owen Center
Mud
Creek
1 Mile
5 000 Feet
Scale 1:15 840


38
N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 27)
R. 1 E.
R. 2 E.
810 000 FEET
2 085 000 FEET
2 075 000 FEET
795 000 FEET
(Joins sheet 37)
(Joins sheet 39)
(Joins sheet 48)
T. 45 N.
Hutchins Park
Latham Park
ATWOOD HOMESTEAD FOREST PRESERVE
ROCK RIVER
Willow Creek
water
7
8
9
12
13
16
17
18
19
20
21
24


(Joins sheet 28)
(Joins sheet 38)
(Joins sheet 40)
(Joins sheet 49)
R. 2 E.
T. 45 N.
BOONE COUNTY
815 000 FEET
830 000 FEET
2 085 000 FEET
2 075 000 FEET
Argyle
Willow Creek
N
1 Mile
5 000 Feet
Scale 1:15 840
0
1/4
1/2
3/4
1
0
1 000
2 000
3 000
4 000
5 000


(Joins sheet 29)
R. 3 E.
350 000 FEET
2 085 000 FEET
T. 45 N.
(Joins sheet 39)
(Joins sheet 41)
(Joins sheet 50)
340 000 FEET
2 075 000 FEET
N
1 Mile
5 000 Feet
Scale 1:15 840
WINNEBAGO COUNTY
Caladonia
7
8
9
10
15
16
17
18
19
20
21
22


41
N
(Joins sheet 30)
(Joins sheet 40)
(Joins sheet 42)
(Joins sheet 51)
R. 3 E.
R. 4 E.
T. 45 N.
355 000 FEET
370 000 FEET
2 085 000 FEET
2 075 000 FEET
310C2
Poplar Grove
1 Mile
5 000 Feet
Scale 1:15 840

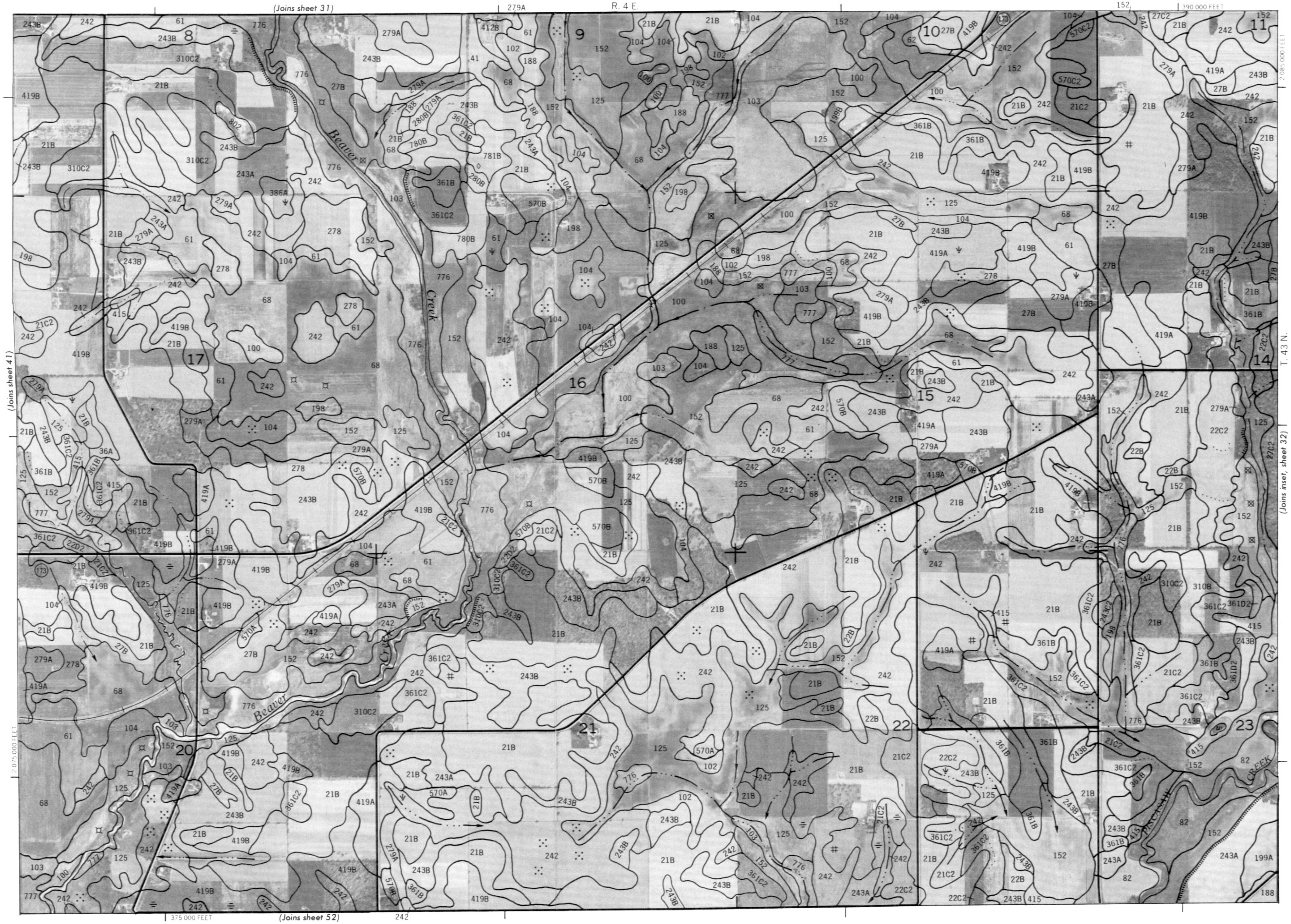
42

N

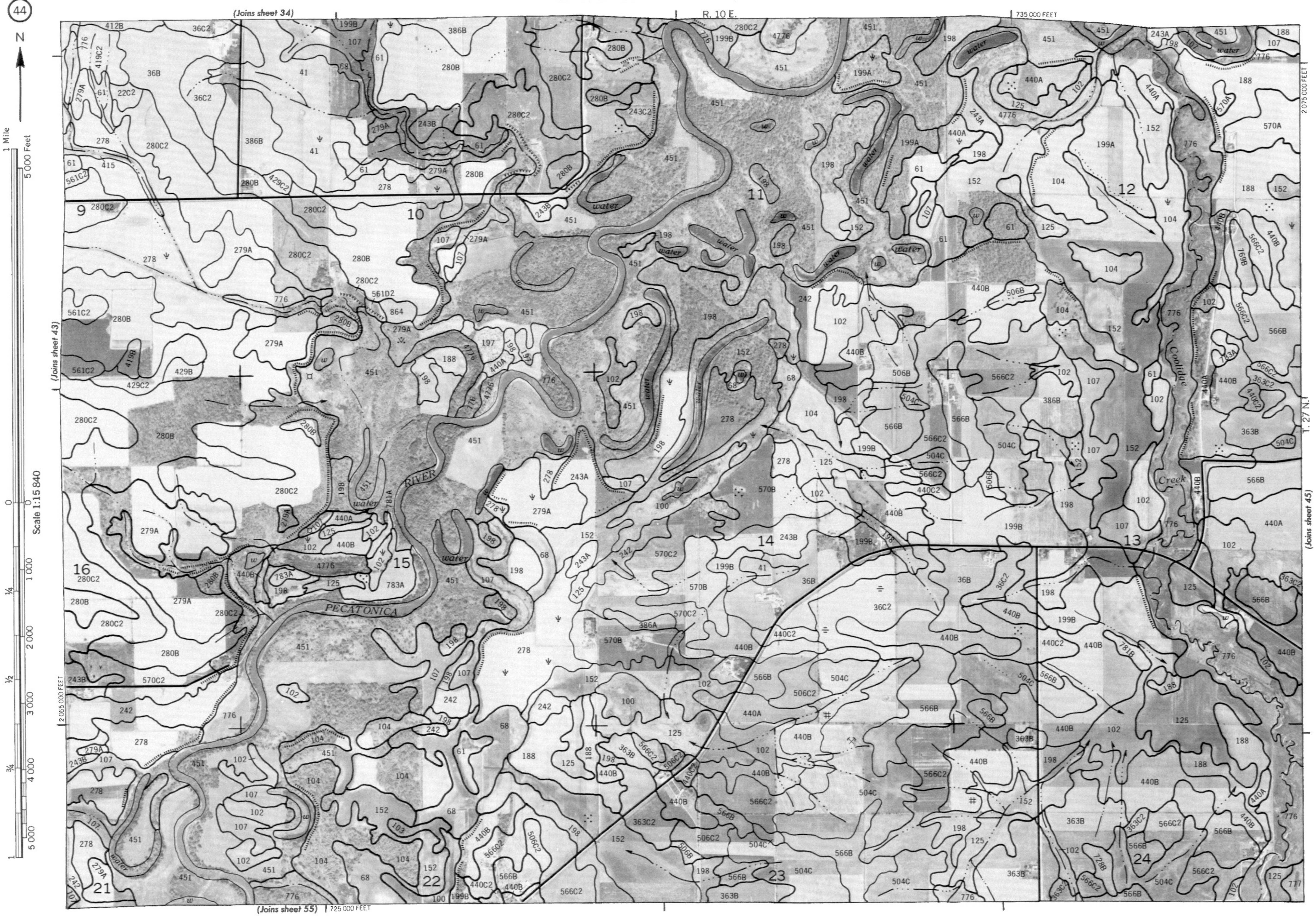
Scale 1:15 840

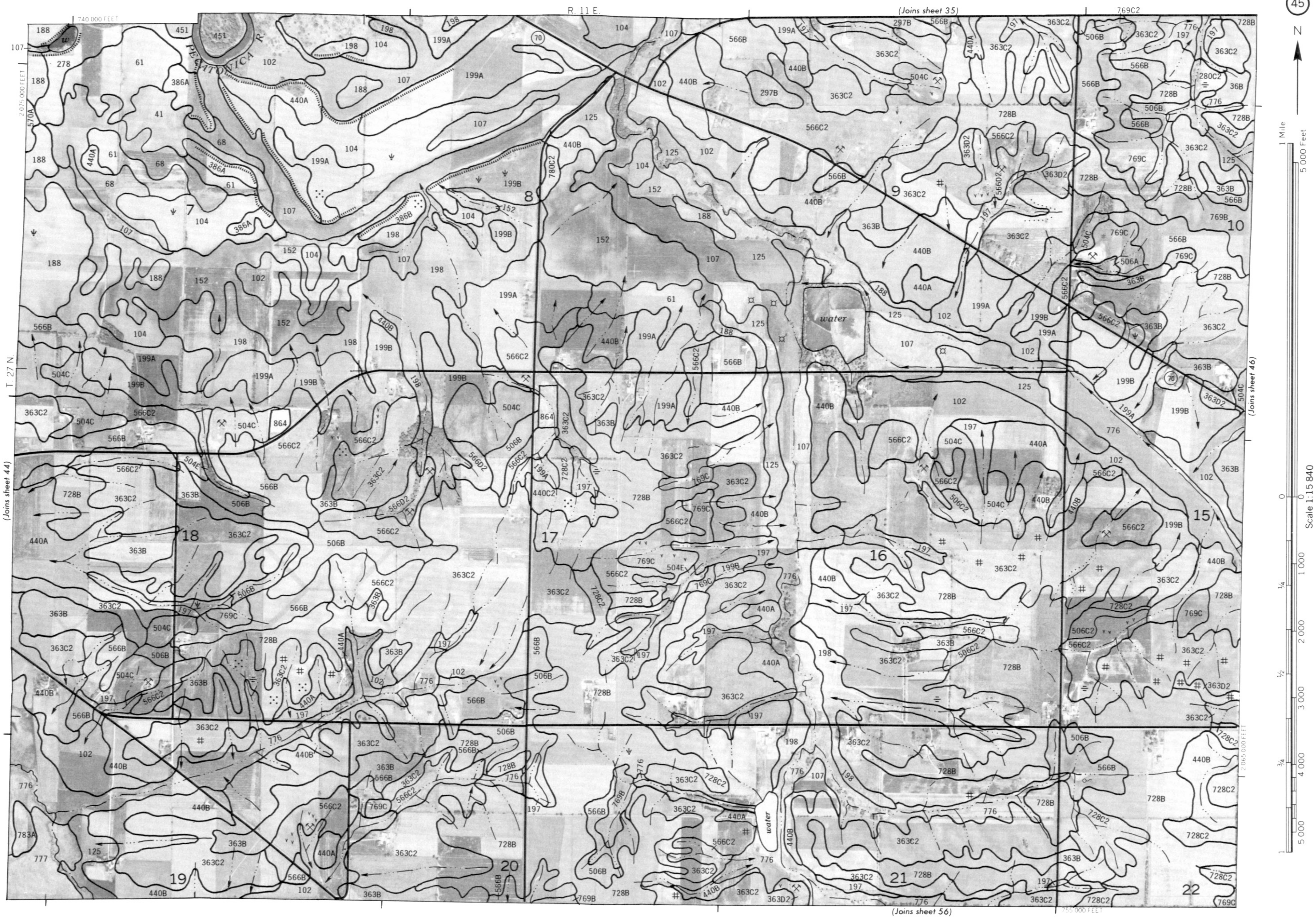
1 Mile
0 ¼ ½ ¾ 1

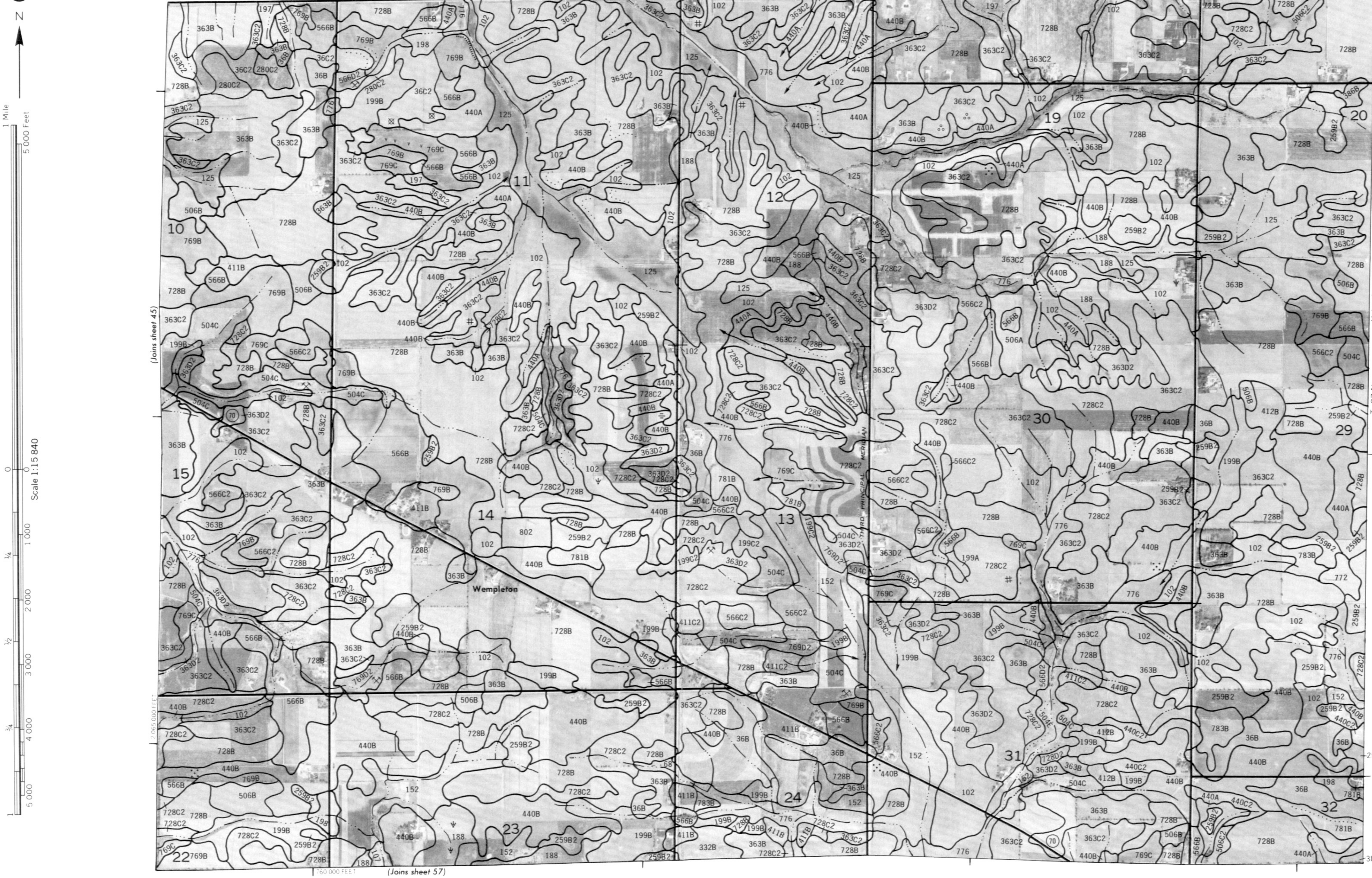
5 000 Feet
0 1 000 2 000 3 000 4 000 5 000

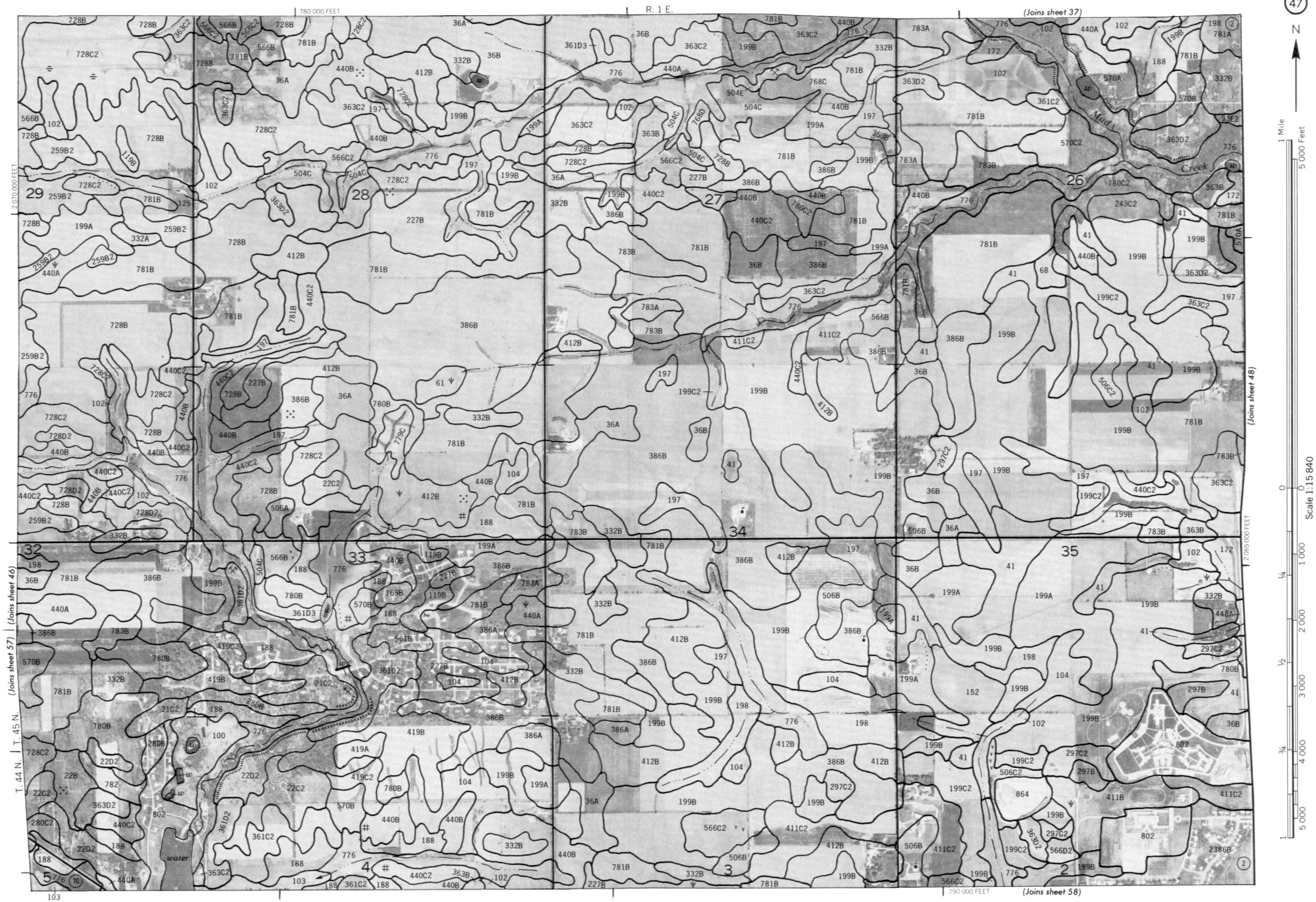


WINNEBAGO AND BOONE COUNTIES, ILLINOIS — SHEET NUMBER 43

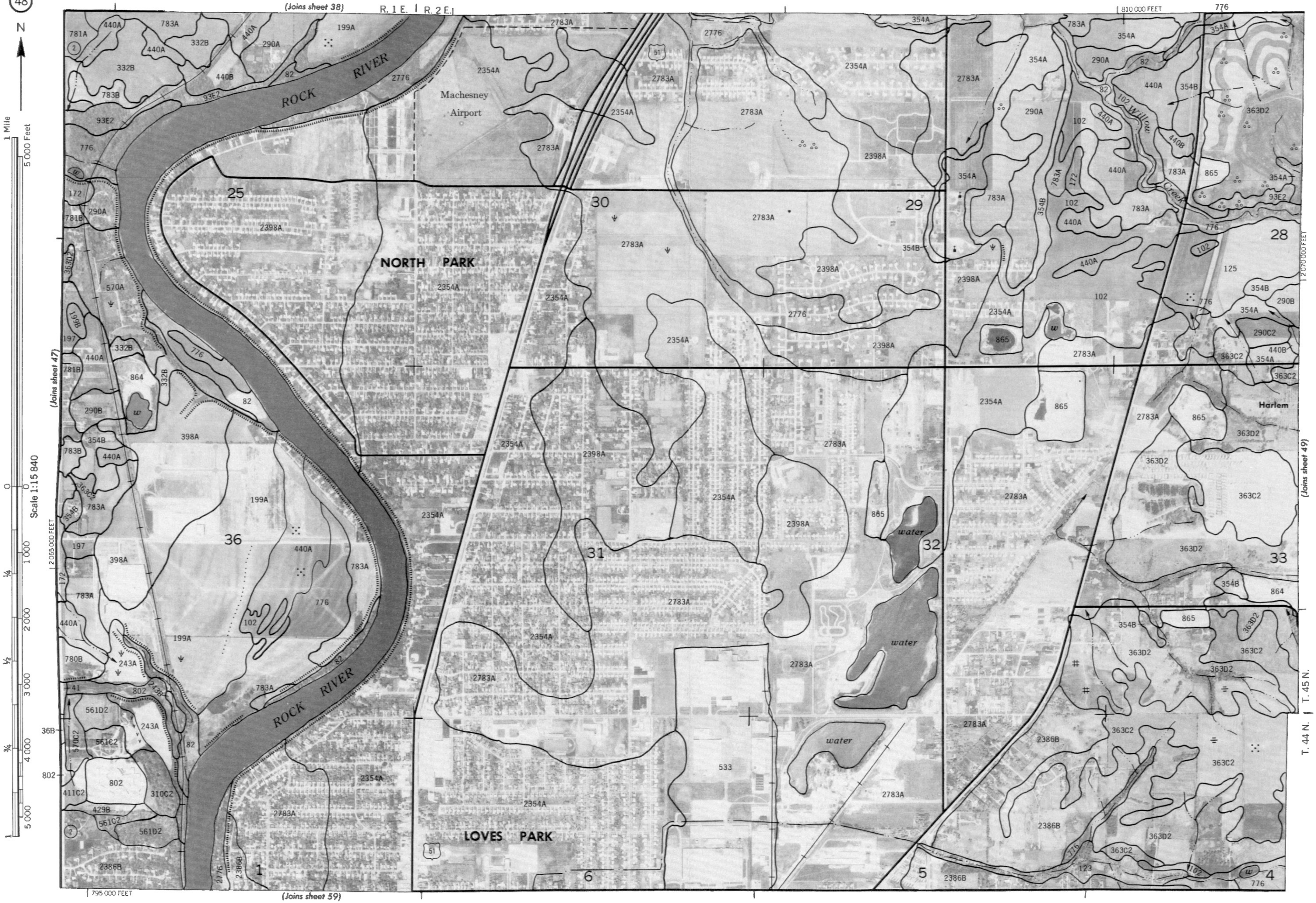

44
N
(Joins sheet 34)
R. 10 E.
735 000 FEET
2 075 000 FEET
(Joins sheet 43)
T. 27 N.
(Joins sheet 45)
2 065 000 FEET
(Joins sheet 55)
725 000 FEET
1 Mile
5 000 Feet
Scale 1:15 840
PECATONICA
RIVER
Coolidge
Creek
water
9
10
11
12
13
14
15
16
21
22
23
24

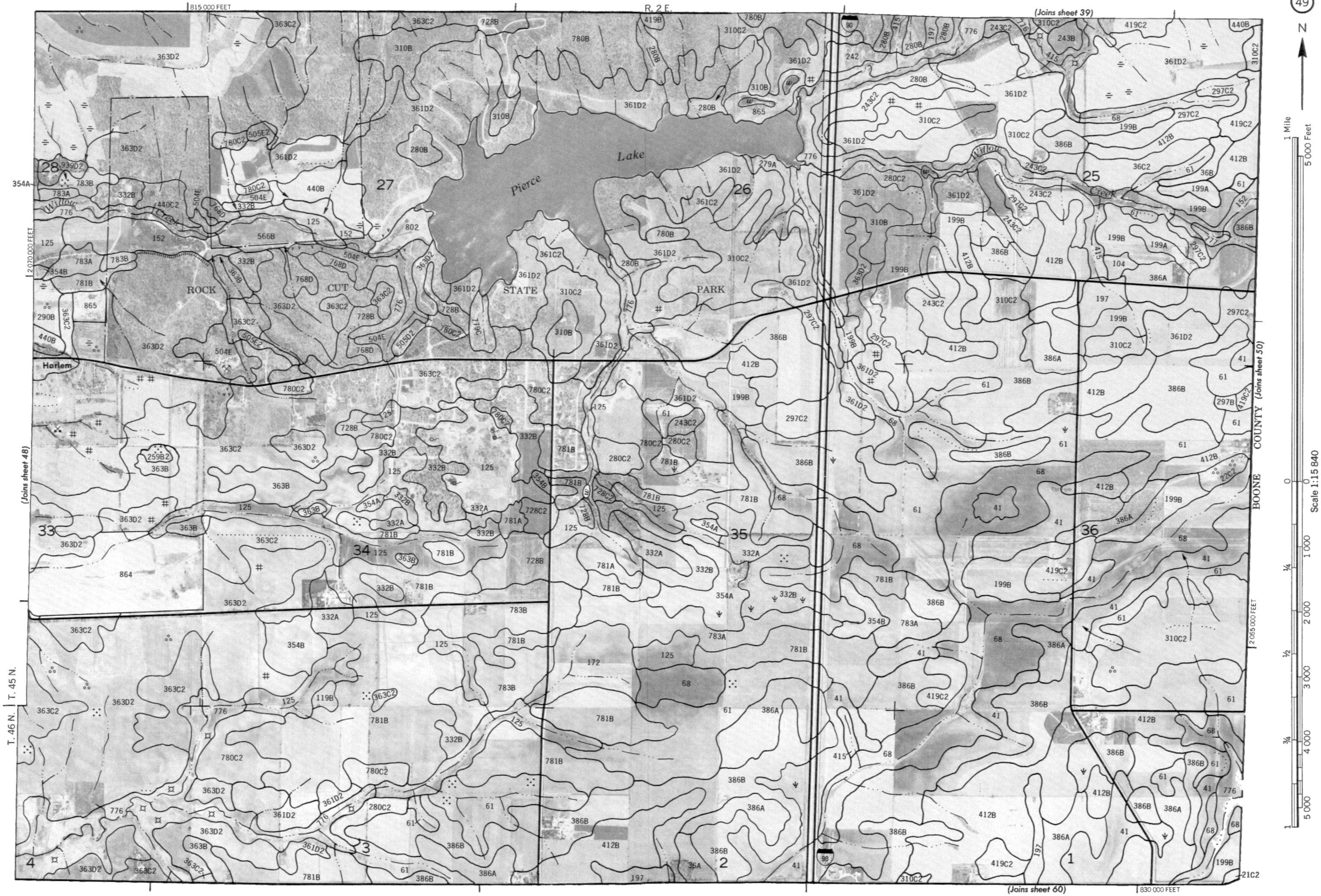

45
N
(Joins sheet 35)
(Joins sheet 44)
(Joins sheet 46)
(Joins sheet 56)
R. 11 E.
T. 27 N.
740 000 FEET
2 075 000 FEET
2 065 000 FEET
765 000 FEET
PECATONICA R.
water
1 Mile
5 000 Feet
Scale 1:15 840
7
8
9
10
15
16
17
18
19
20
21
22

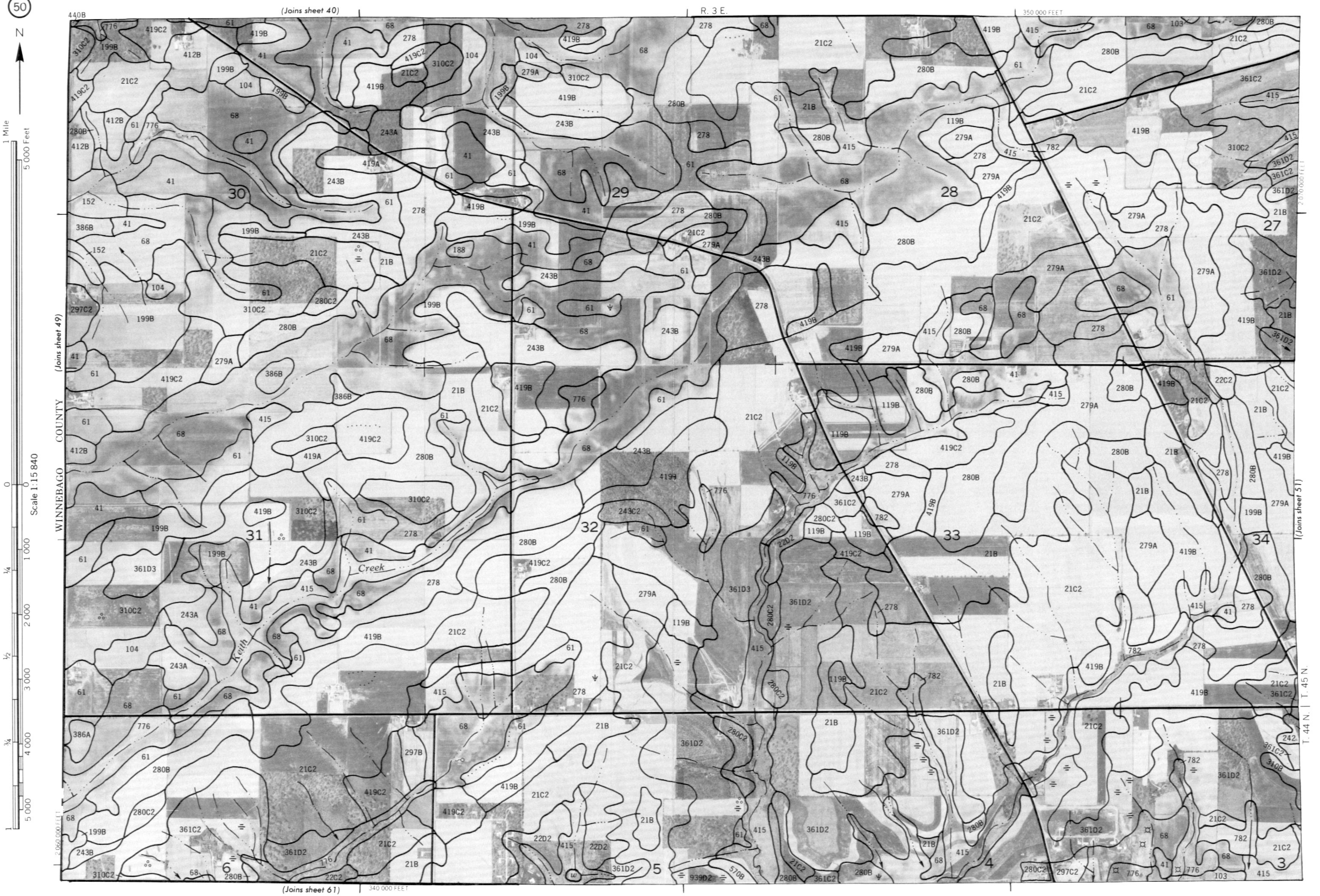

(Joins sheet 36)
(Joins sheet 45)
(Joins sheet 37)
(Joins sheet 47)
(Joins sheet 57)
R. 11 E.
R. 1 E.
T. 27 N.
THIRD PRINCIPAL MERIDIAN
Wempleton
775 000 FEET
2 075 000 FEET
2 065 000 FEET
760 000 FEET
N
Scale 1:15 840
1 Mile
5 000 Feet
0
¼
½
¾
1 000
2 000
3 000
4 000
5 000

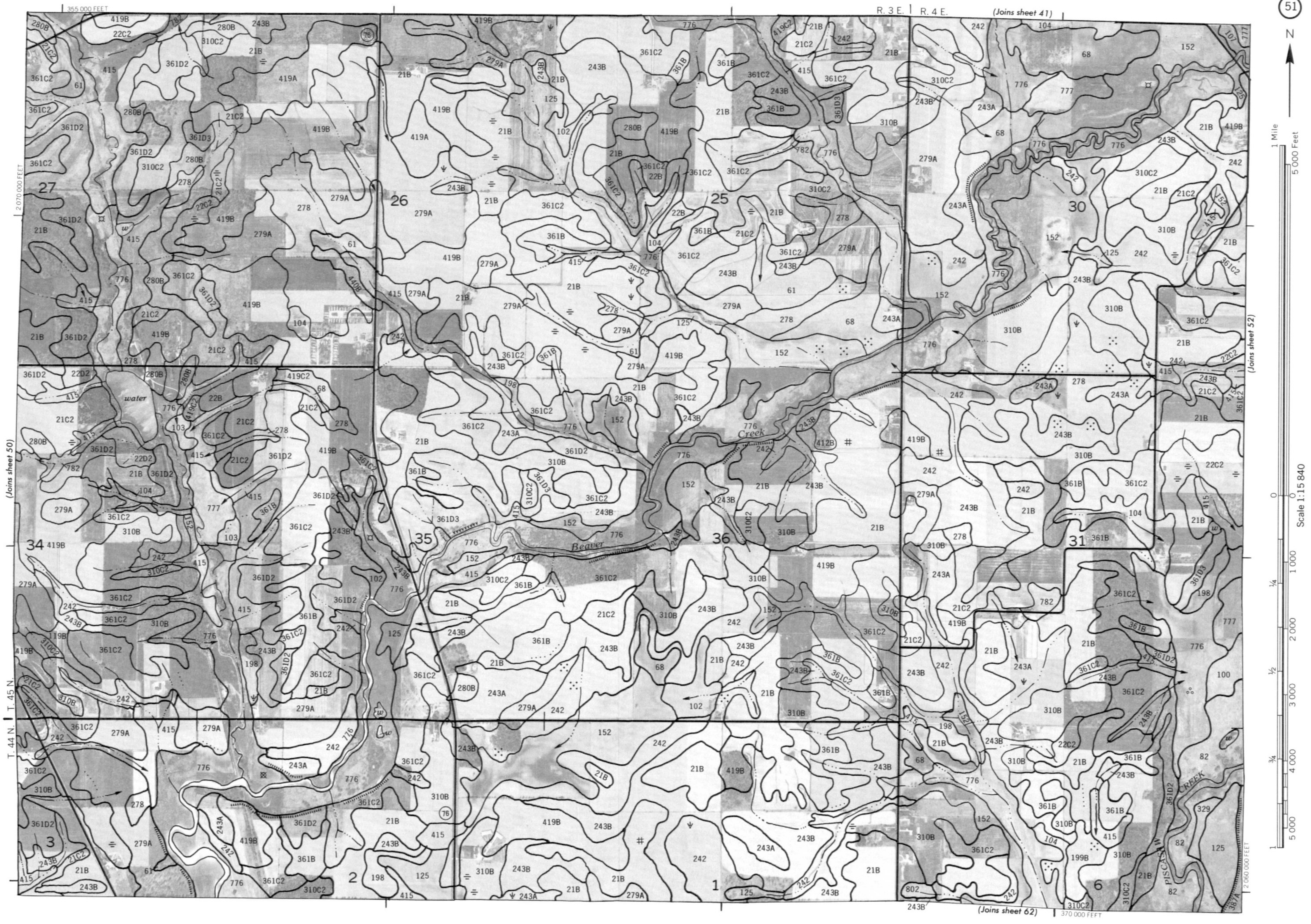


47
780 000 FEET
R. 1 E.
(Joins sheet 37)
(Joins sheet 48)
(Joins sheet 46)
(Joins sheet 57)
(Joins sheet 58)
790 000 FEET
2 070 000 FEET
2 065 000 FEET
T. 45 N.
T. 44 N.
Mud Creek
water
N
1 Mile
5 000 Feet
Scale 1:15 840

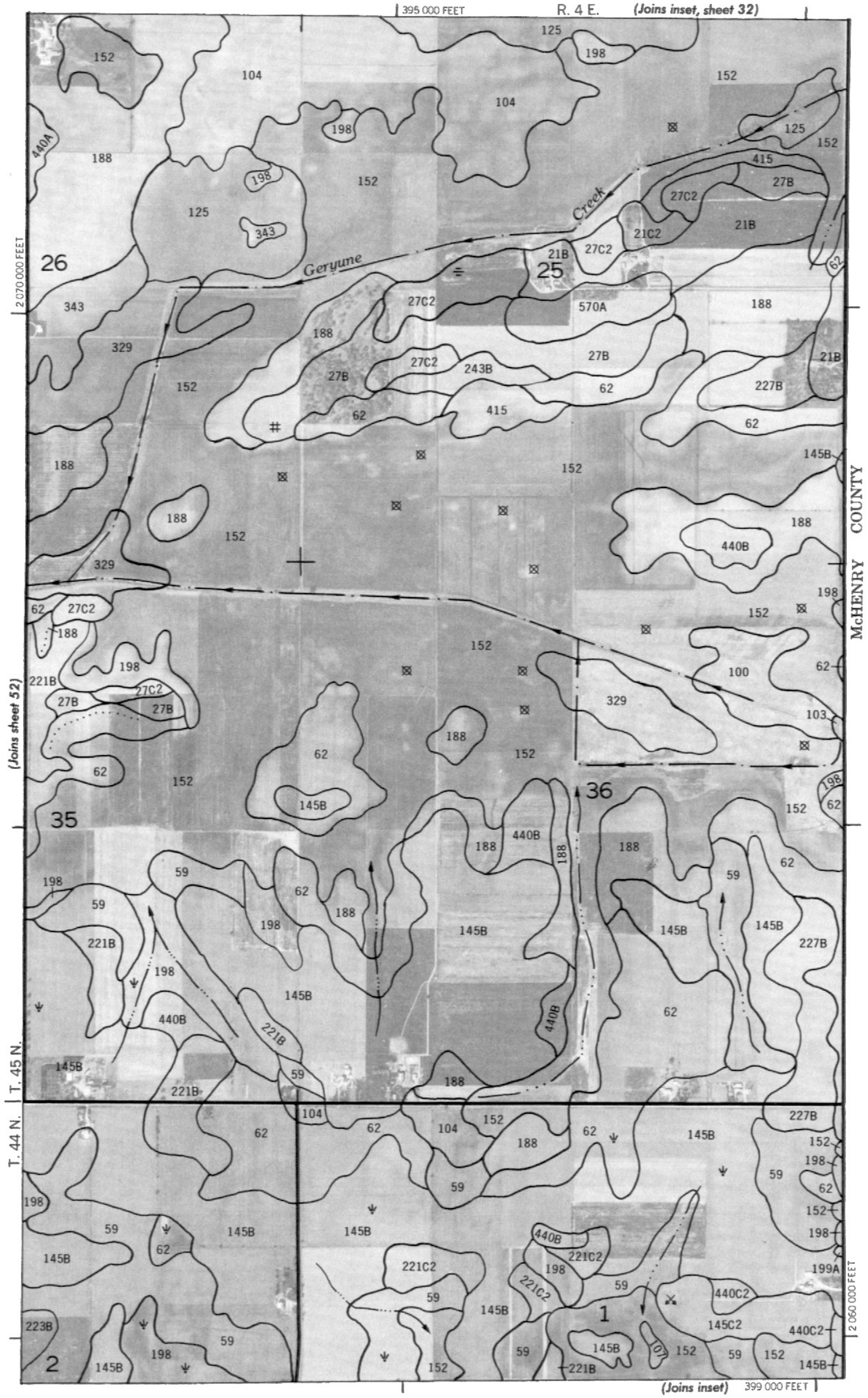

(Joins sheet 38)
(Joins sheet 47)
(Joins sheet 49)
(Joins sheet 59)
R. 1 E.
R. 2 E.
T. 45 N.
T. 44 N.
N
1 Mile
5 000 Feet
Scale 1:15 840
810 000 FEET
795 000 FEET
2 070 000 FEET
2 055 000 FEET
ROCK RIVER
Machesney Airport
NORTH PARK
LOVES PARK
Harlem
Willow Creek
water
25
30
29
28
36
31
32
33
1
6
5
4

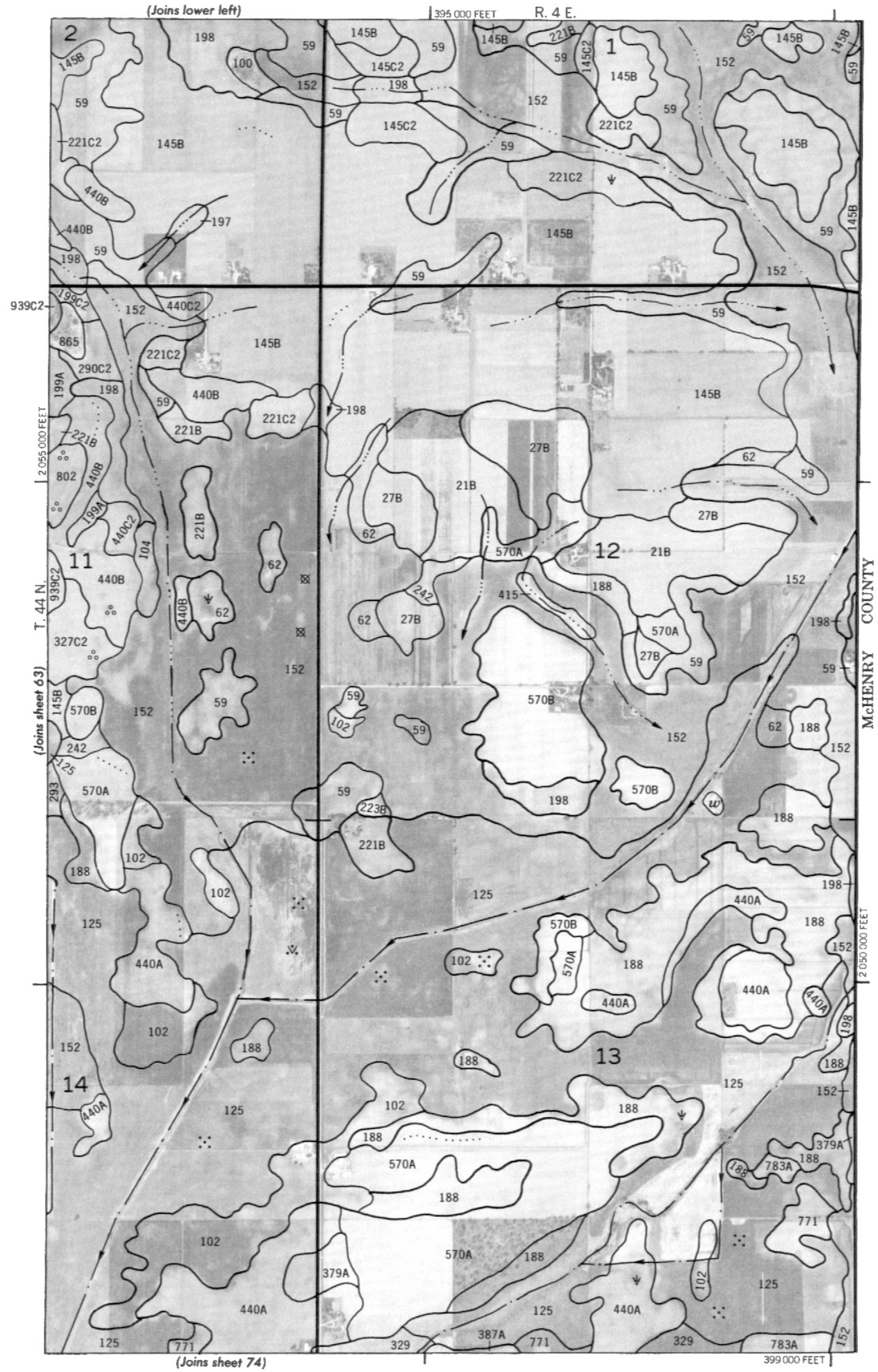

815 000 FEET
R. 2 E.
(Joins sheet 39)
N
Pierce Lake
ROCK CUT STATE PARK
Willow Creek
Harlem
(Joins sheet 48)
(Joins sheet 50)
BOONE COUNTY
(Joins sheet 60)
830 000 FEET
2 070 000 FEET
2 065 000 FEET
T. 46 N.
T. 45 N.
1 Mile
5 000 Feet
Scale 1:15 840
90
27
26
25
28
33
34
35
36
4
3
2
1


N
(Joins sheet 40)
R. 3 E.
350 000 FEET
(Joins sheet 49)
(Joins sheet 51)
(Joins sheet 61)
340 000 FEET
2 070 000 FEET
2 060 000 FEET
T. 45 N.
T. 44 N.
WINNEBAGO COUNTY
Scale 1:15 840
1 Mile
5 000 Feet
Keith
Creek
30
29
28
27
31
32
33
34
6
5
4
3

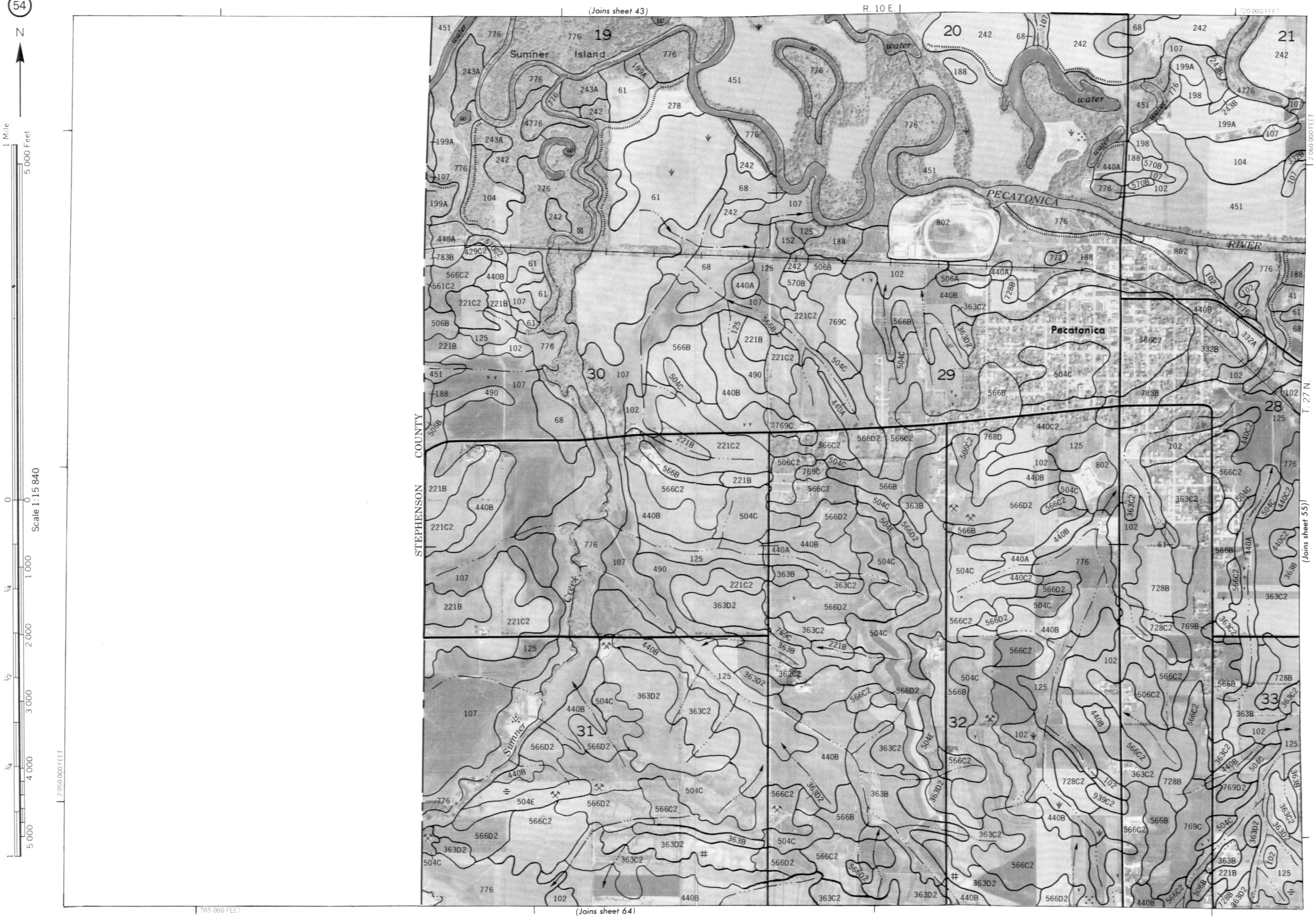

51
N
355 000 FEET
R. 3 E.
R. 4 E.
(Joins sheet 41)
(Joins sheet 52)
(Joins sheet 62)
(Joins sheet 50)
2 070 000 FEET
2 060 000 FEET
370 000 FEET
T. 45 N.
T. 44 N.
27
26
25
30
34
35
36
31
3
2
1
6
Beaver
Creek
PISCASAW
CREEK
water
1 Mile
5 000 Feet
Scale 1:15 840

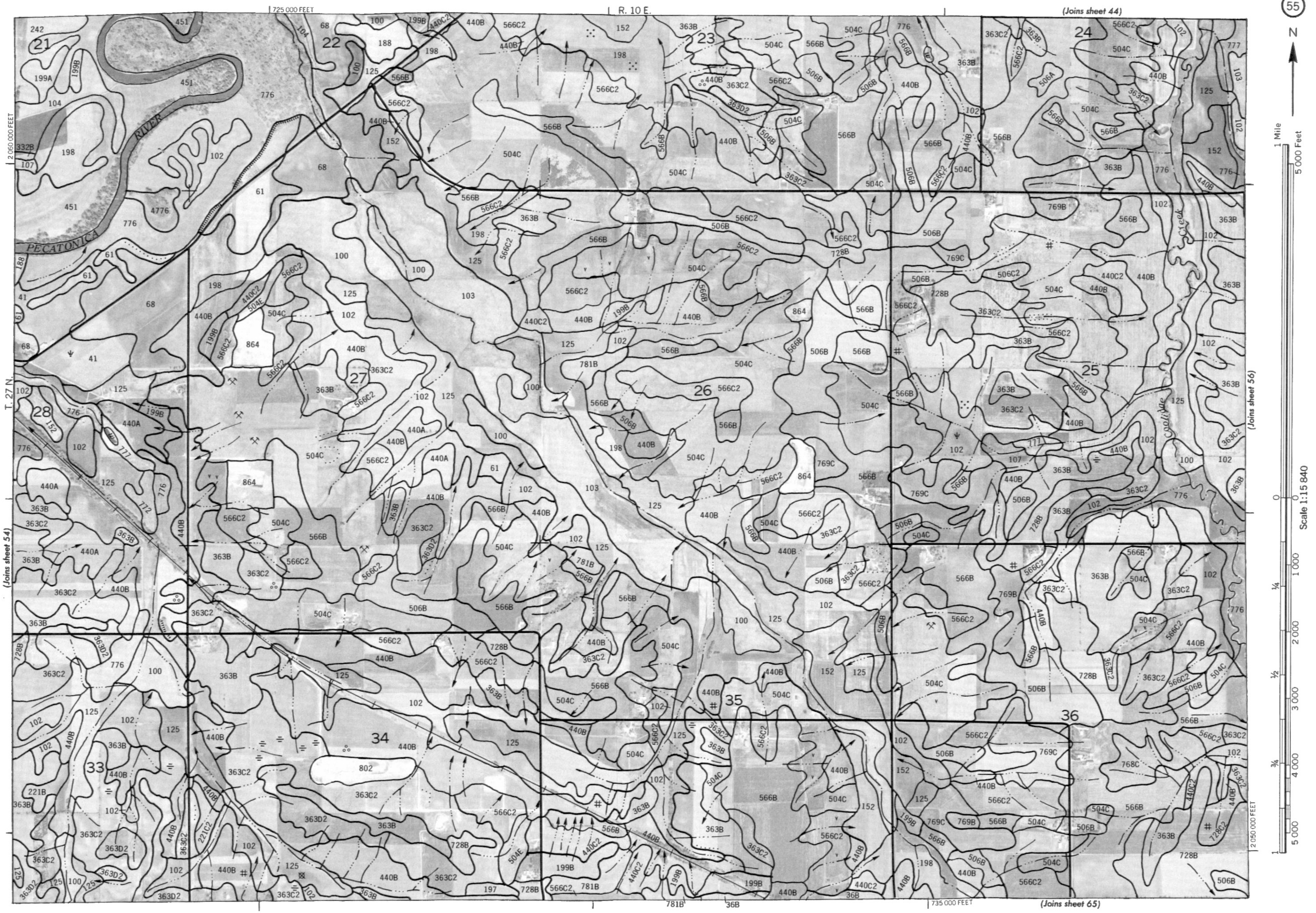

52
N
(Joins sheet 42)
R. 4 E.
390 000 FEET
2 070 000 FEET
(Joins sheet 51)
(Joins sheet 53)
(Joins sheet 63)
375 000 FEET
2 060 000 FEET
T. 45 N.
T. 44 N.
PISCASAW
RIVER
Geryune
Creek
Russellville
29
28
27
26
32
33
34
35
5
4
3
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1 000
2 000
3 000
4 000
5 000

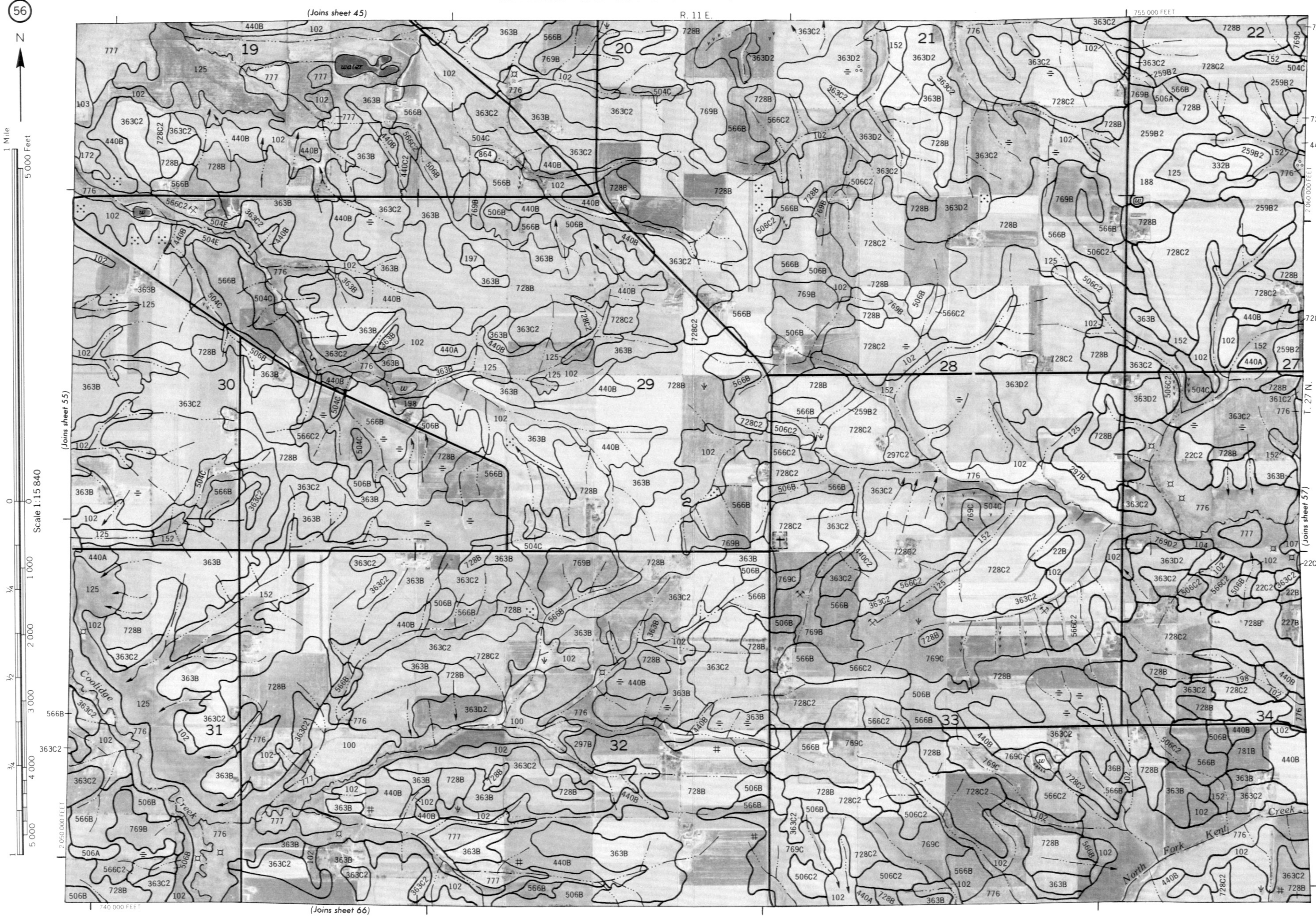

395 000 FEET
R. 4 E.
(Joins inset, sheet 32)
2 070 000 FEET
Geryune
Creek
26
25
35
36
1
2
T. 45 N.
T. 44 N.
(Joins sheet 52)
McHENRY COUNTY
2 060 000 FEET
(Joins inset)
399 000 FEET

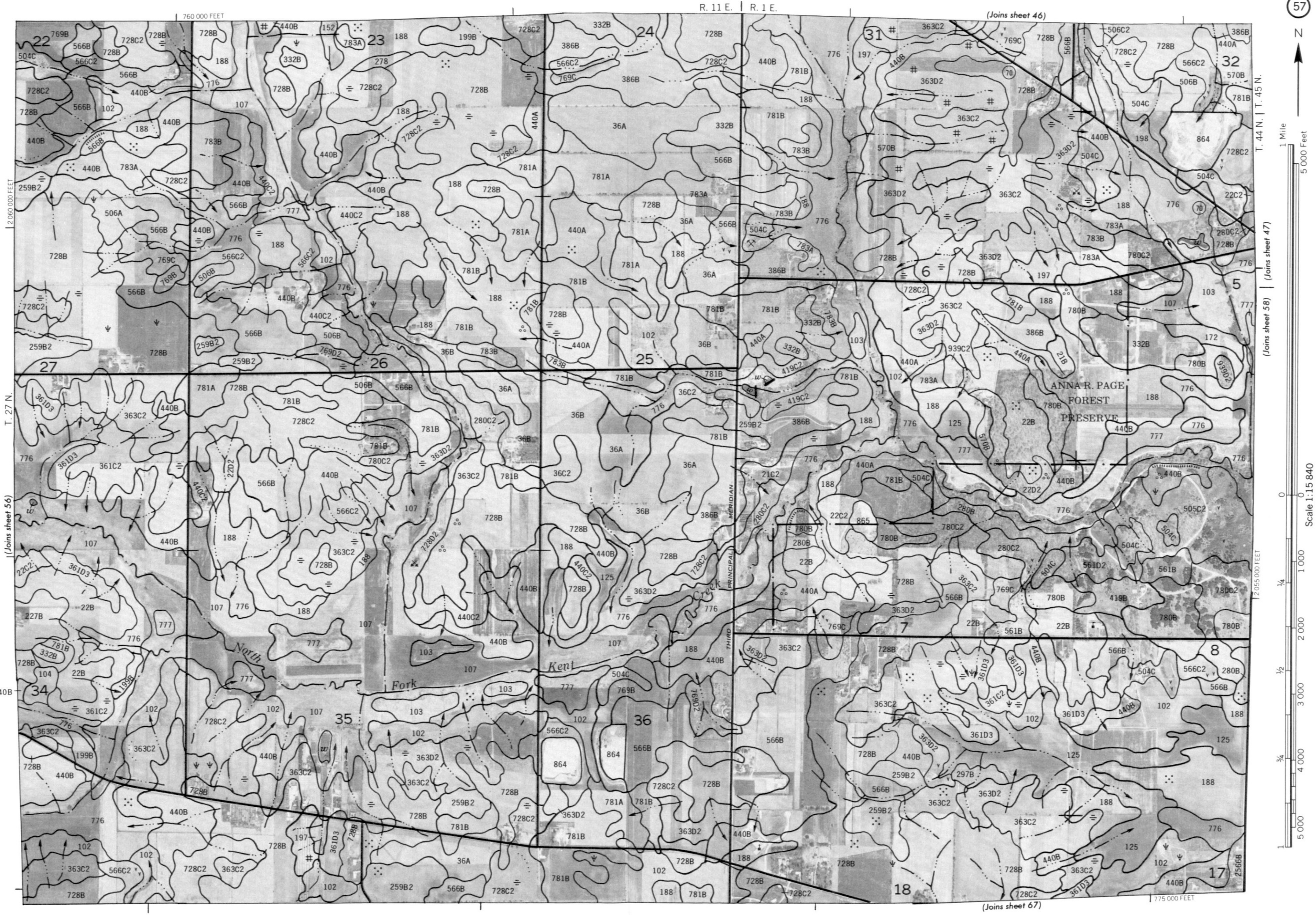

(Joins lower left)
395 000 FEET
R. 4 E.
2
1
11
12
13
14
T. 44 N.
2 055 000 FEET
(Joins sheet 63)
McHENRY COUNTY
2 050 000 FEET
(Joins sheet 74)
399 000 FEET


N
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1
1 000
2 000
3 000
4 000
5 000

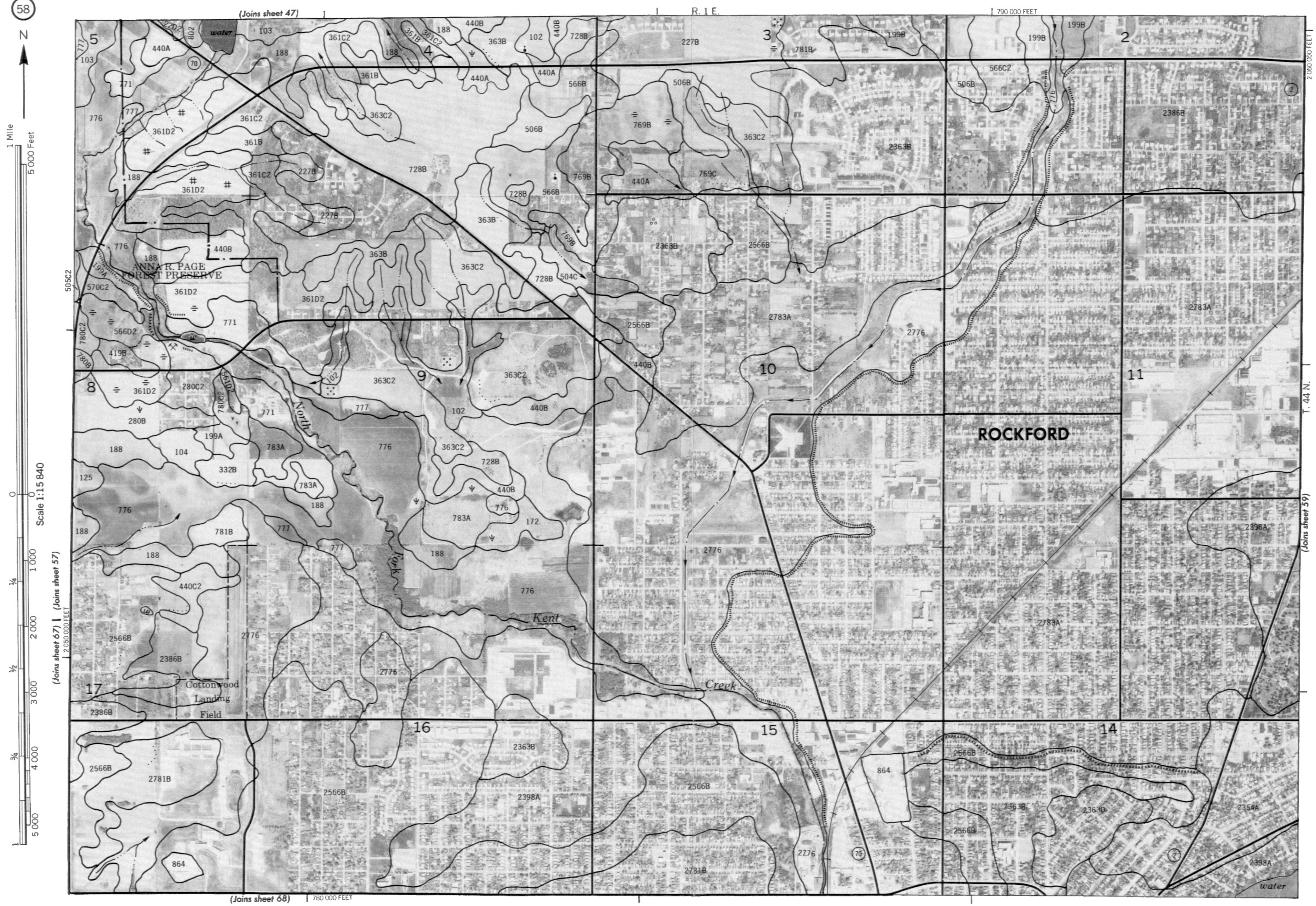

(Joins sheet 43)
R. 10 E.
720 000 FEET
2 060 000 FEET
2 050 000 FEET
705 000 FEET
(Joins sheet 55)
(Joins sheet 64)
T. 27 N.
N
1 Mile
5 000 Feet
0
Scale 1:15 840
1 000
2 000
3 000
4 000
5 000
¼
½
¾
STEPHENSON COUNTY
Sumner Island
Sumner Creek
PECATONICA RIVER
Pecatonica
water
19
20
21
28
29
30
31
32
33

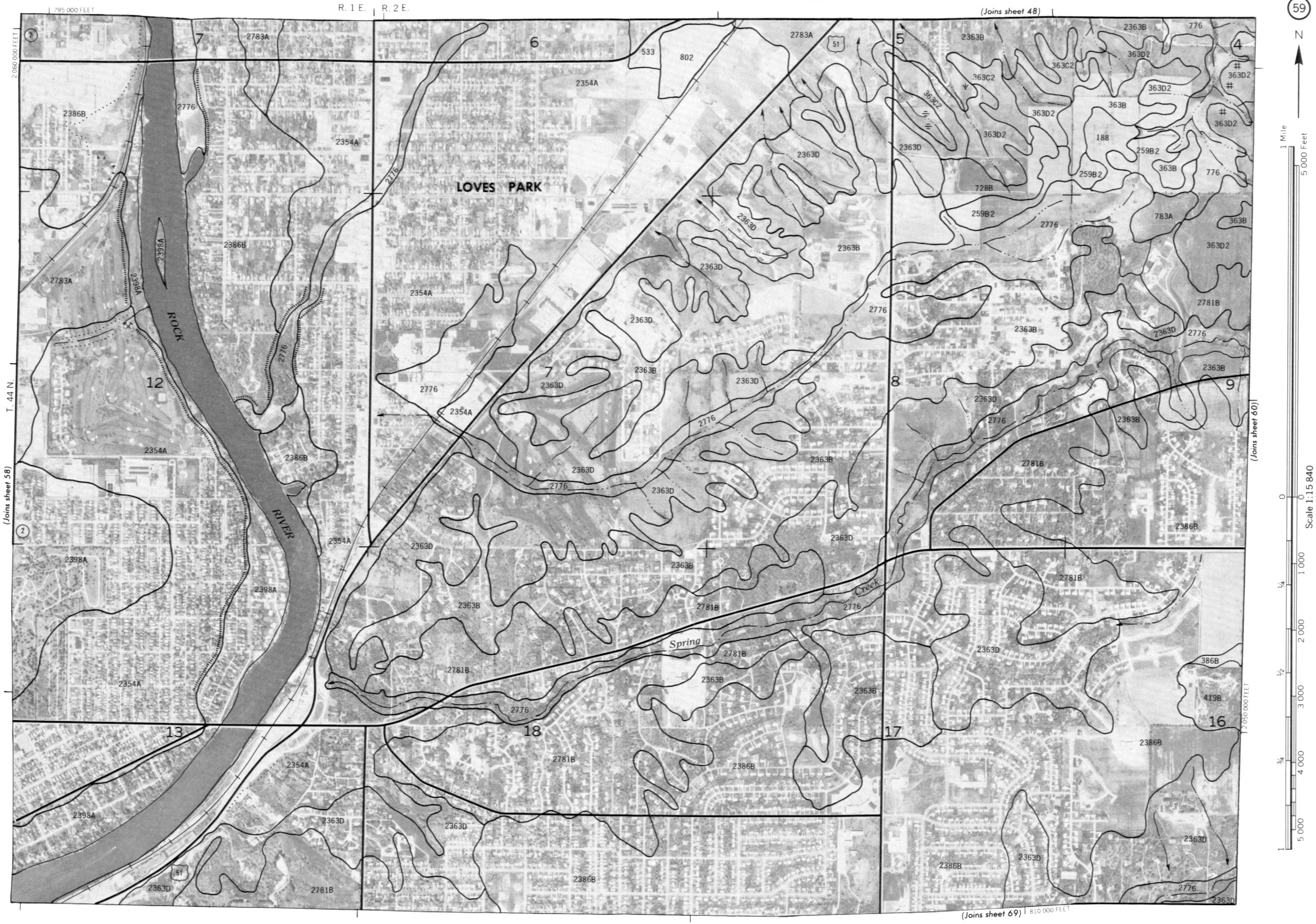

55
N
725 000 FEET
R. 10 E.
(Joins sheet 44)
(Joins sheet 54)
(Joins sheet 56)
(Joins sheet 65)
T. 27 N.
2 060 000 FEET
2 050 000 FEET
735 000 FEET
PECATONICA
RIVER
Coolidge Creek
1 Mile
5 000 Feet
Scale 1:15 840


56
N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 45)
R. 11 E.
755 000 FEET
(Joins sheet 55)
(Joins sheet 57)
T. 27 N.
2 060 000 FEET
2 050 000 FEET
740 000 FEET
(Joins sheet 66)
19
20
21
22
27
28
29
30
31
32
33
34
water
Coolidge Creek
North Fork Kent Creek

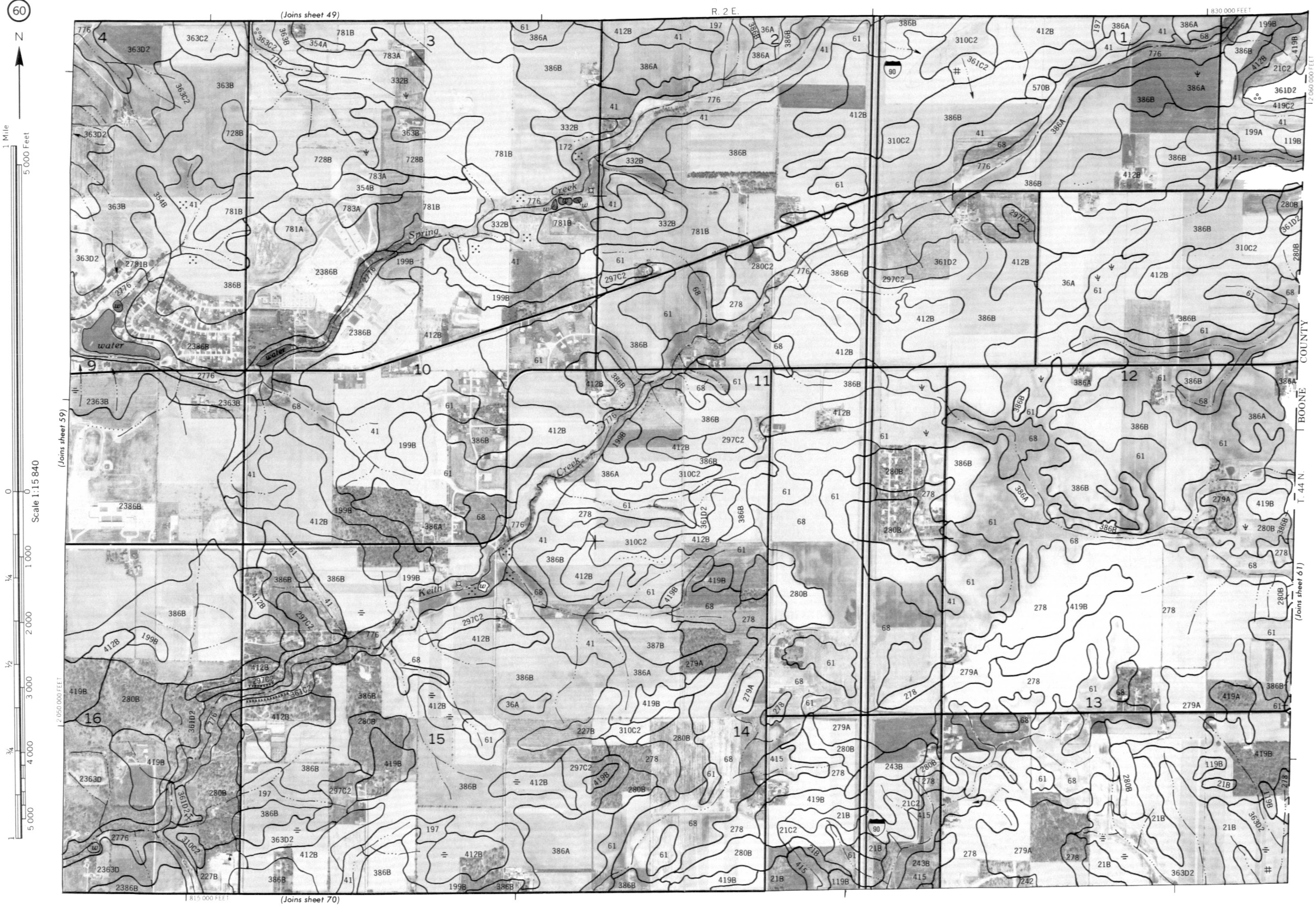


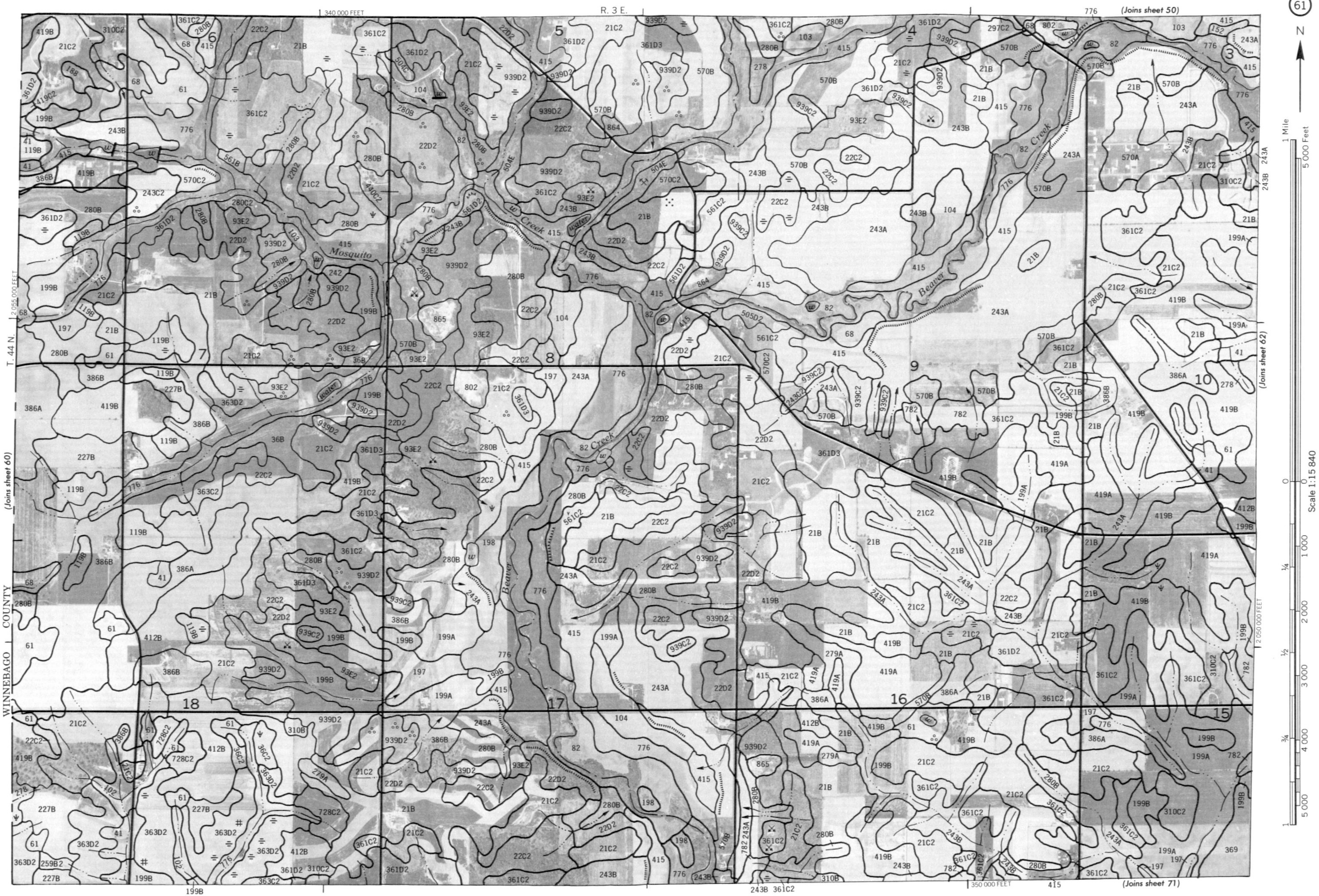
57
R. 11 E. | R. 1 E.
760 000 FEET
(Joins sheet 46)
(Joins sheet 47)
(Joins sheet 58)
(Joins sheet 56)
(Joins sheet 67)
T. 45 N.
T. 44 N.
T. 27 N.
2 060 000 FEET
2 055 000 FEET
775 000 FEET
ANNA R. PAGE
FOREST
PRESERVE
THIRD PRINCIPAL MERIDIAN
North Fork Kent Creek
N
1 Mile
5 000 Feet
Scale 1:15 840

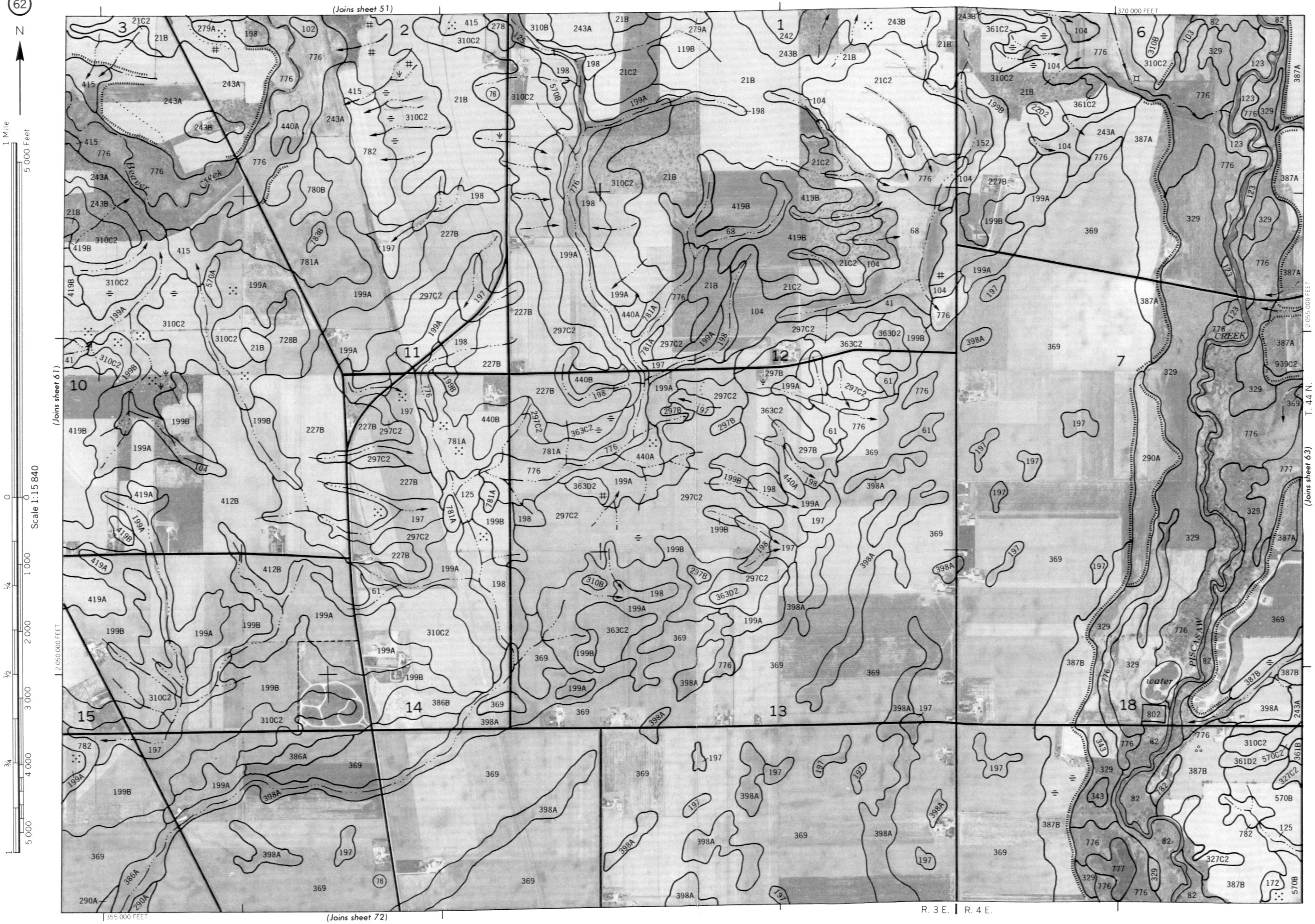

(Joins sheet 47)
(Joins sheet 57)
(Joins sheet 59)
(Joins sheet 67)
(Joins sheet 68)
R. 1 E.
T. 44 N.
790 000 FEET
780 000 FEET
2 050 000 FEET
2 060 000 FEET
ROCKFORD
ANNA R. PAGE FOREST PRESERVE
Cottonwood Landing Field
North Fork Kent Creek
water
N
Scale 1:15 840
1 Mile
5 000 Feet
0 1000 2000 3000 4000 5000
0 ¼ ½ ¾ 1

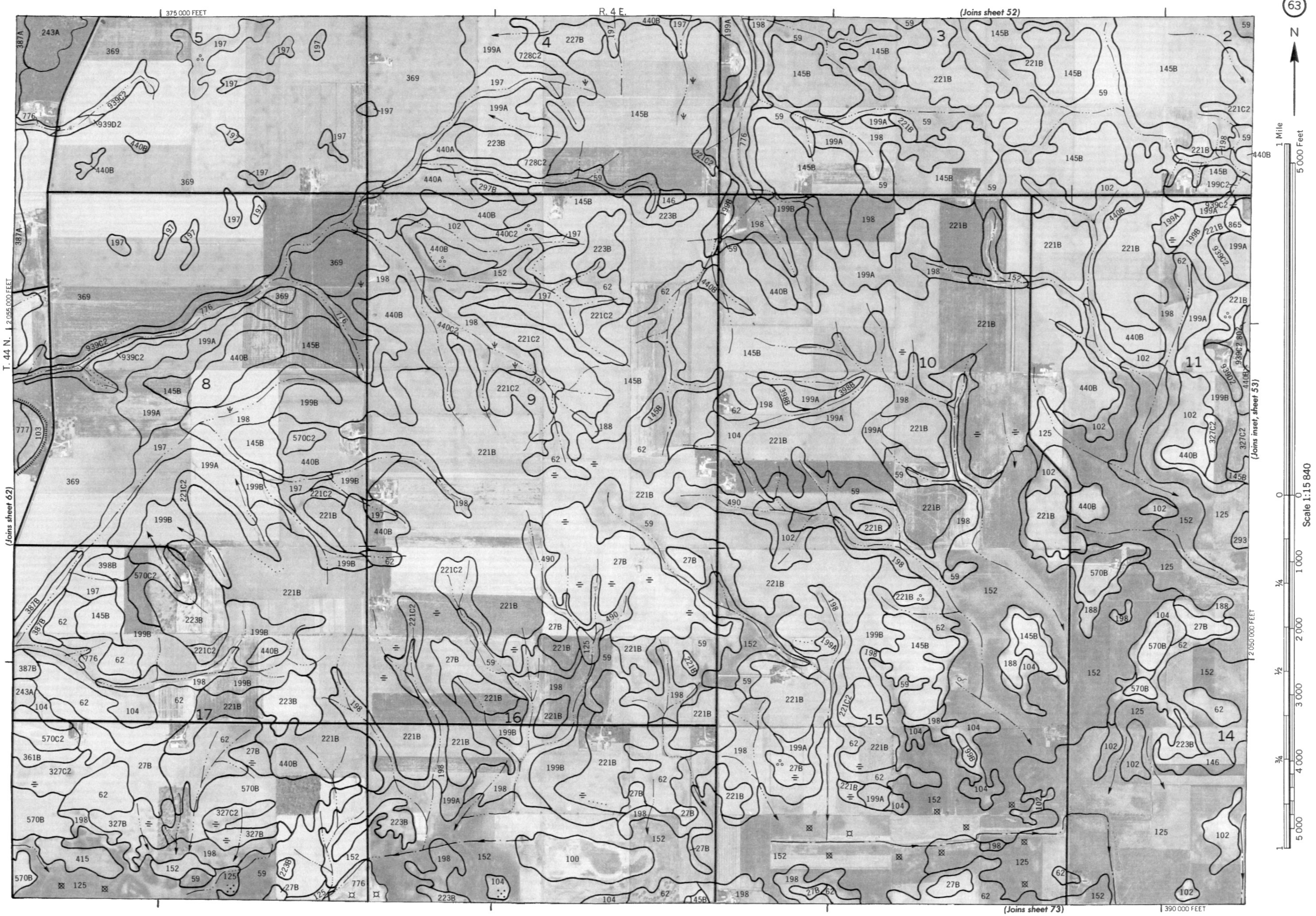


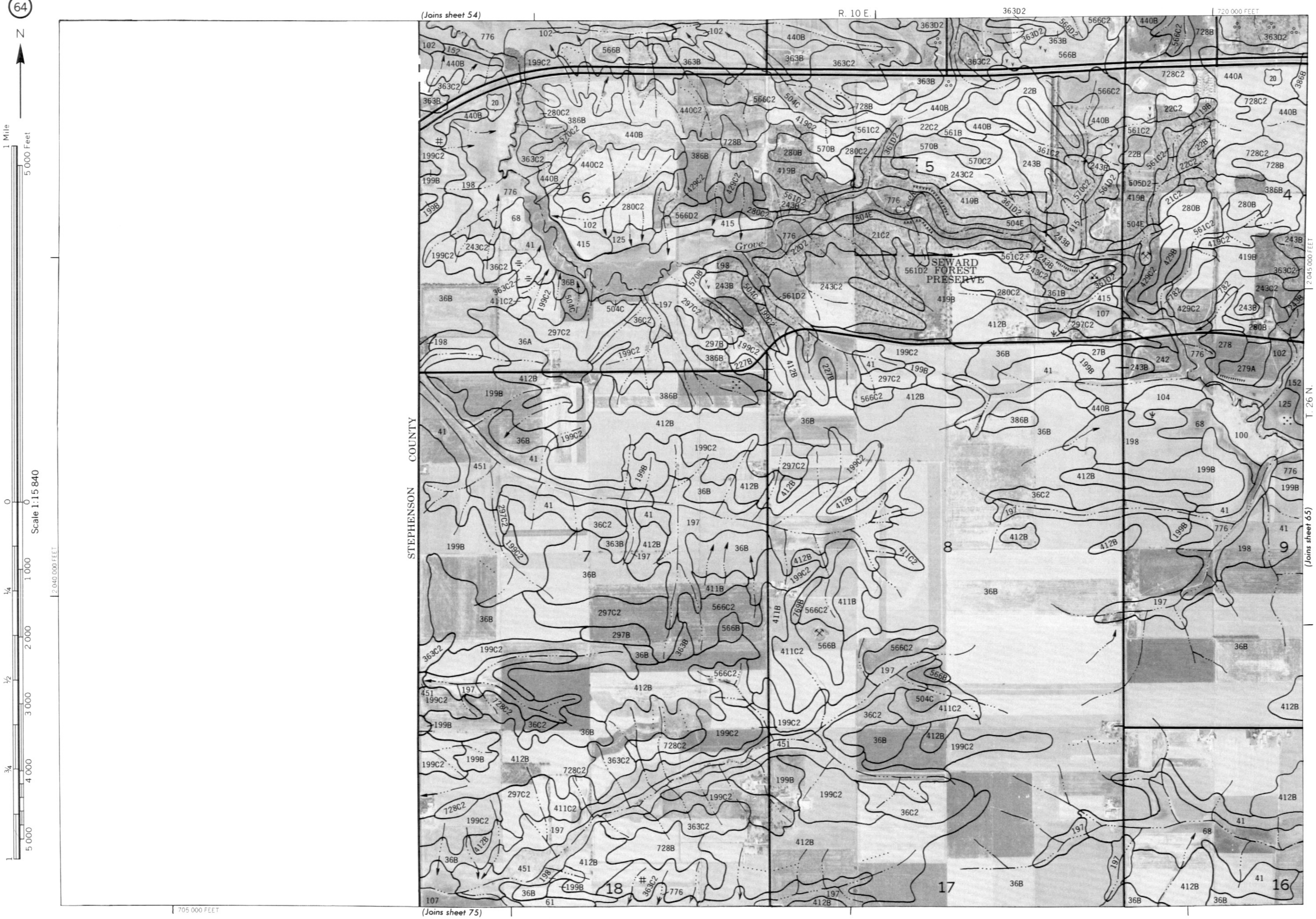
59
795 000 FEET
R. 1 E.
R. 2 E.
(Joins sheet 48)
N
2 060 000 FEET
LOVES PARK
ROCK
RIVER
Spring
Creek
T. 44 N.
(Joins sheet 58)
(Joins sheet 60)
(Joins sheet 69)
810 000 FEET
2 050 000 FEET
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1
0
1 000
2 000
3 000
4 000
5 000
7
6
5
4
12
8
9
13
18
17
16
2783A
533
802
2354A
2776
2386B
2398A
2783A
363B
363D2
363C2
2363D
2363B
188
259B2
728B
783A
776
2781B
2386B
386B
419B


60
(Joins sheet 49)
R. 2 E.
830 000 FEET
2 060 000 FEET
N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 59)
(Joins sheet 61)
(Joins sheet 70)
2 050 000 FEET
815 000 FEET
BOONE COUNTY
T. 44 N.
Spring Creek
Keith Creek
water
90

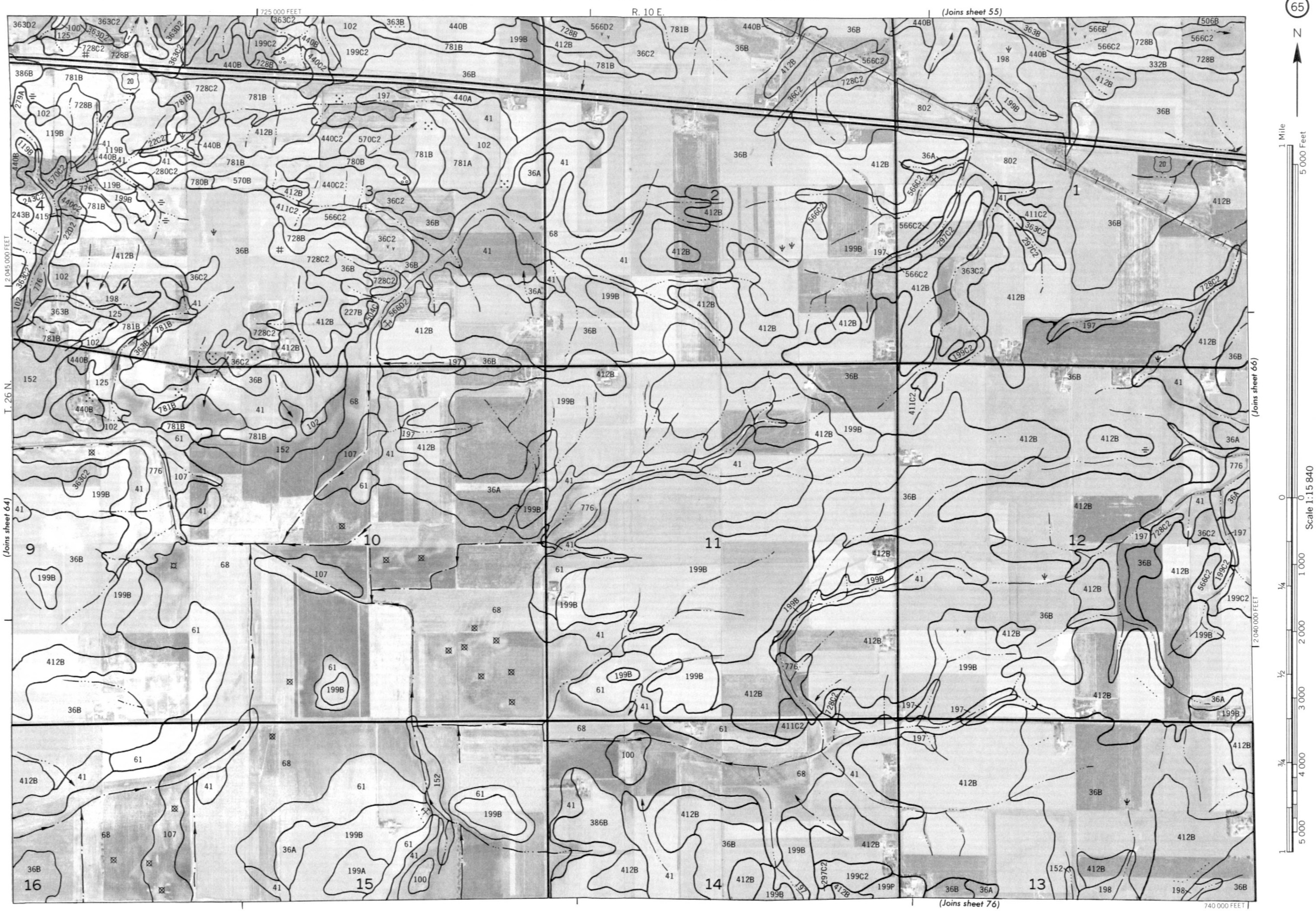

340 000 FEET
R. 3 E.
(Joins sheet 50)
T. 44 N.
2 065 000 FEET
(Joins sheet 60)
(Joins sheet 62)
(Joins sheet 71)
2 050 000 FEET
350 000 FEET
WINNEBAGO COUNTY
Mosquito
Creek
Beaver
N
1 Mile
5 000 Feet
Scale 1:15 840
5
4
3
6
7
8
9
10
18
17
16
15

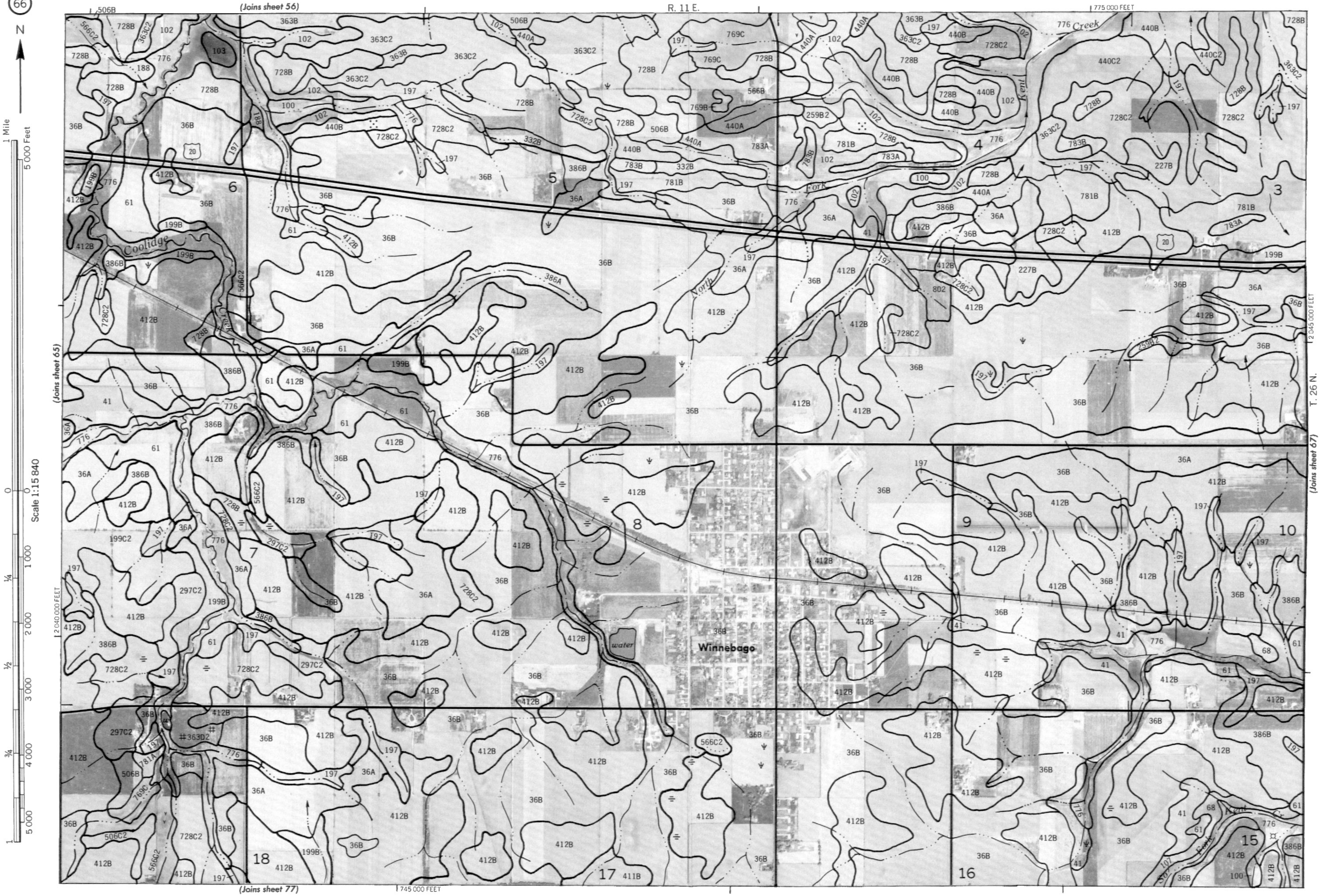

N
(Joins sheet 51)
(Joins sheet 61)
(Joins sheet 63)
(Joins sheet 72)
Beaver Creek
PISCASAW CREEK
water
370 000 FEET
355 000 FEET
2 055 000 FEET
2 050 000 FEET
T. 44 N.
R. 3 E. | R. 4 E.
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾
1

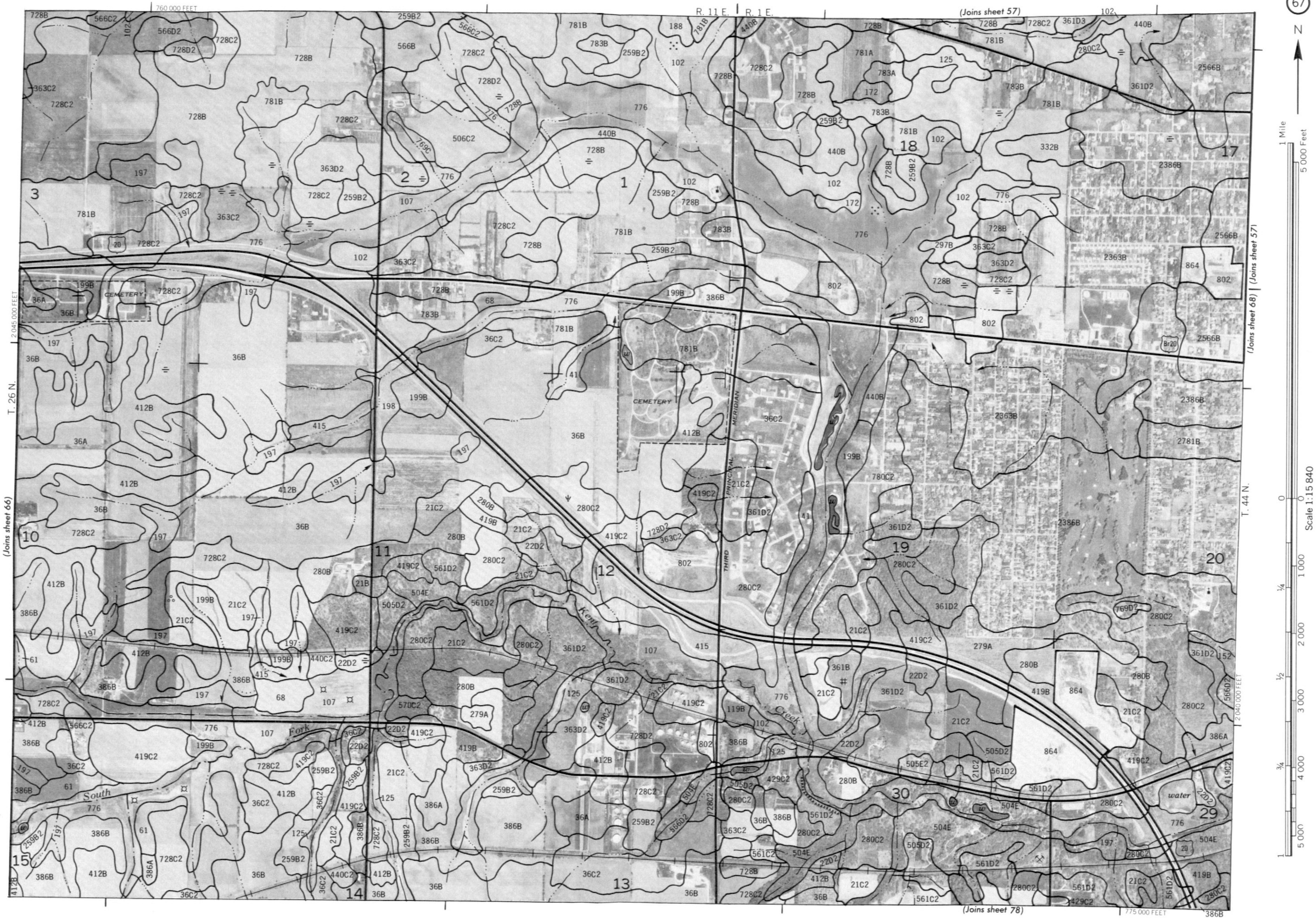

63
N
375 000 FEET
R. 4 E.
(Joins sheet 52)
T. 44 N.
2 055 000 FEET
(Joins sheet 62)
(Joins inset, sheet 53)
2 050 000 FEET
(Joins sheet 73)
390 000 FEET
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1
1 000
2 000
3 000
4 000
5 000

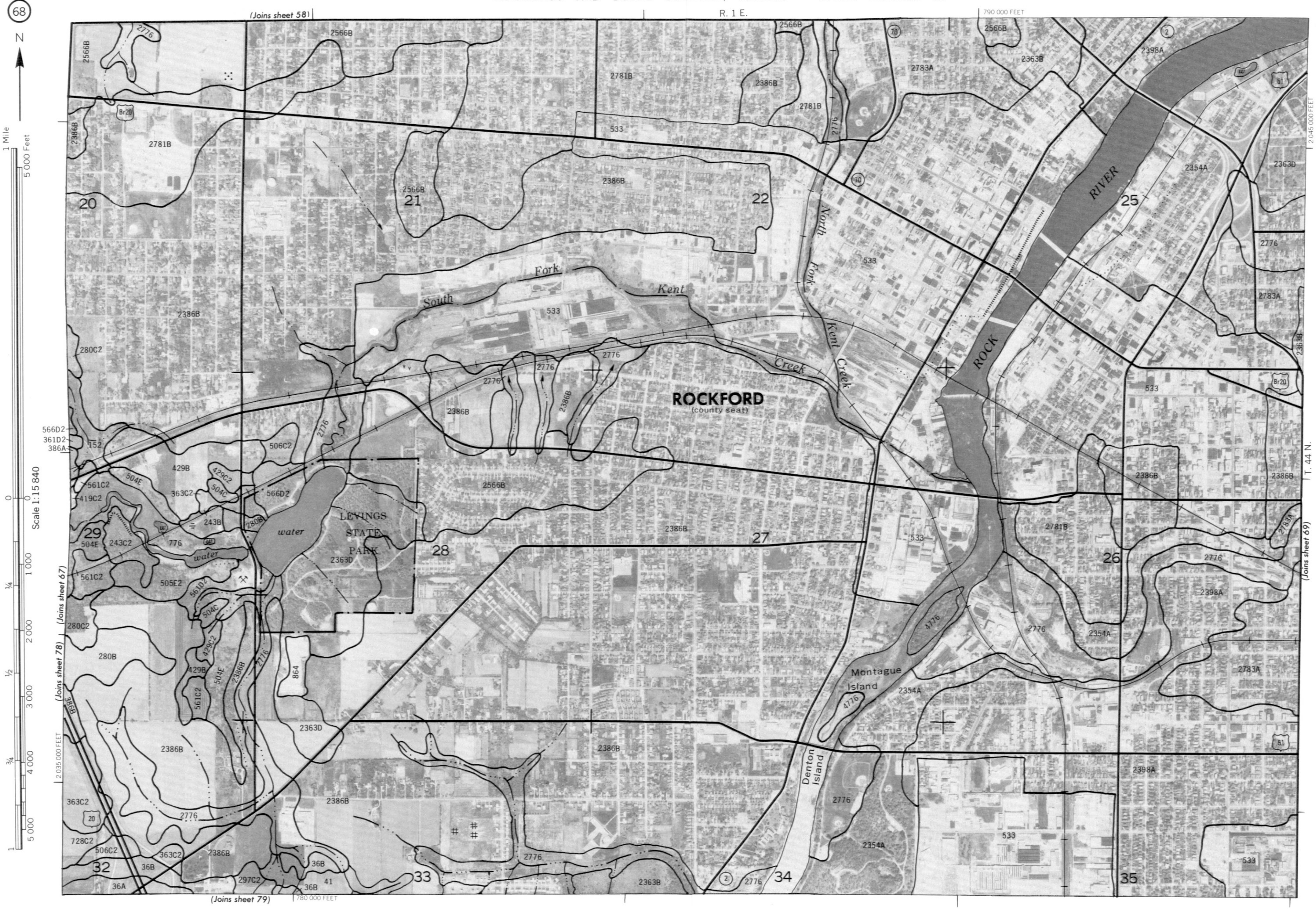

N
1 Mile
5 000 Feet
0
0
Scale 1:15 840
1 000
¼
2 000
½
3 000
4 000
¾
5 000
1
(Joins sheet 54)
R. 10 E.
720 000 FEET
2 045 000 FEET
T. 26 N.
(Joins sheet 65)
2 040 000 FEET
705 000 FEET
(Joins sheet 75)
STEPHENSON COUNTY
SEWARD FOREST PRESERVE
Grove
Creek
20
6
5
4
7
8
9
18
17
16

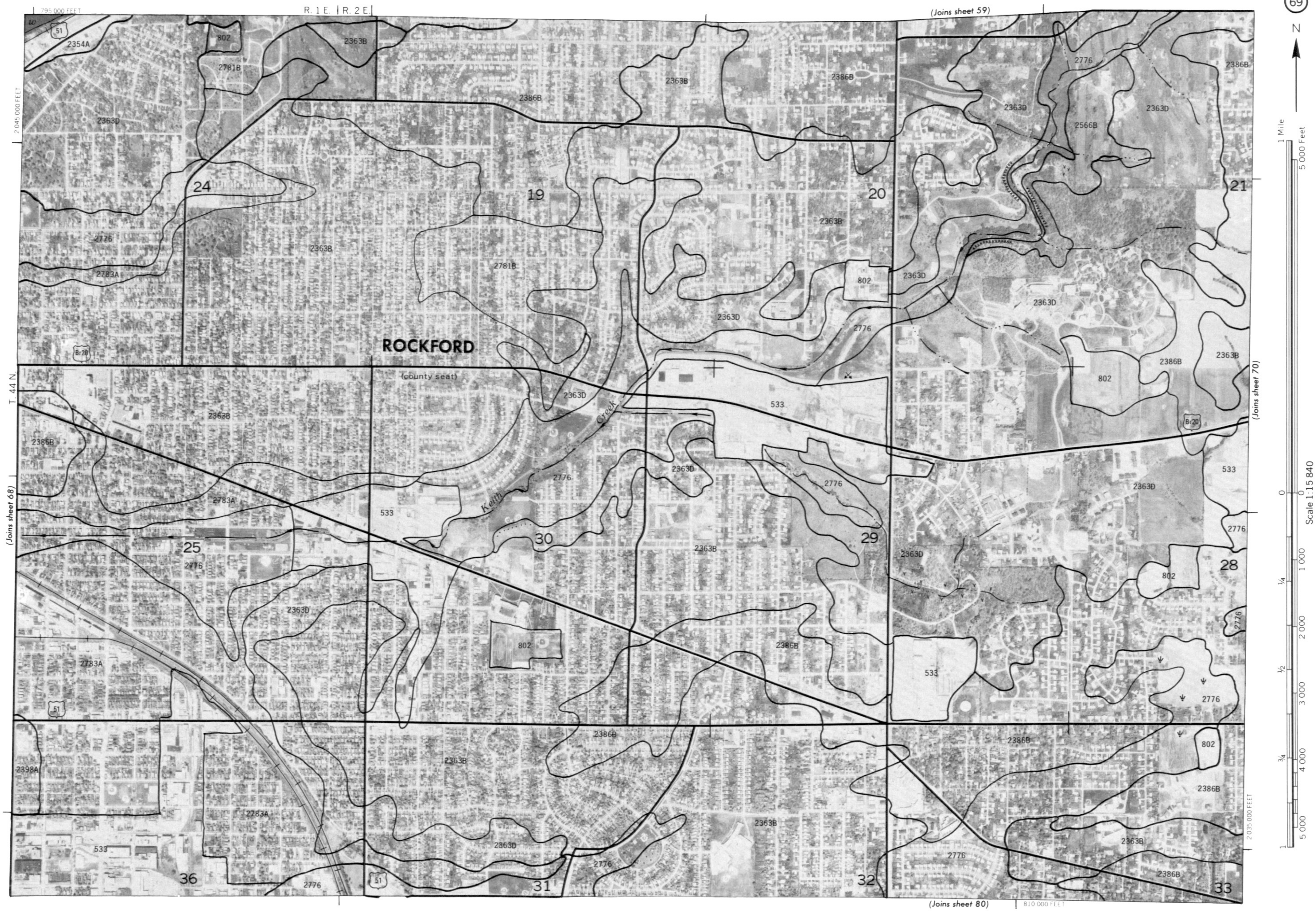
WINNEBAGO AND BOONE COUNTIES, ILLINOIS — SHEET NUMBER 65

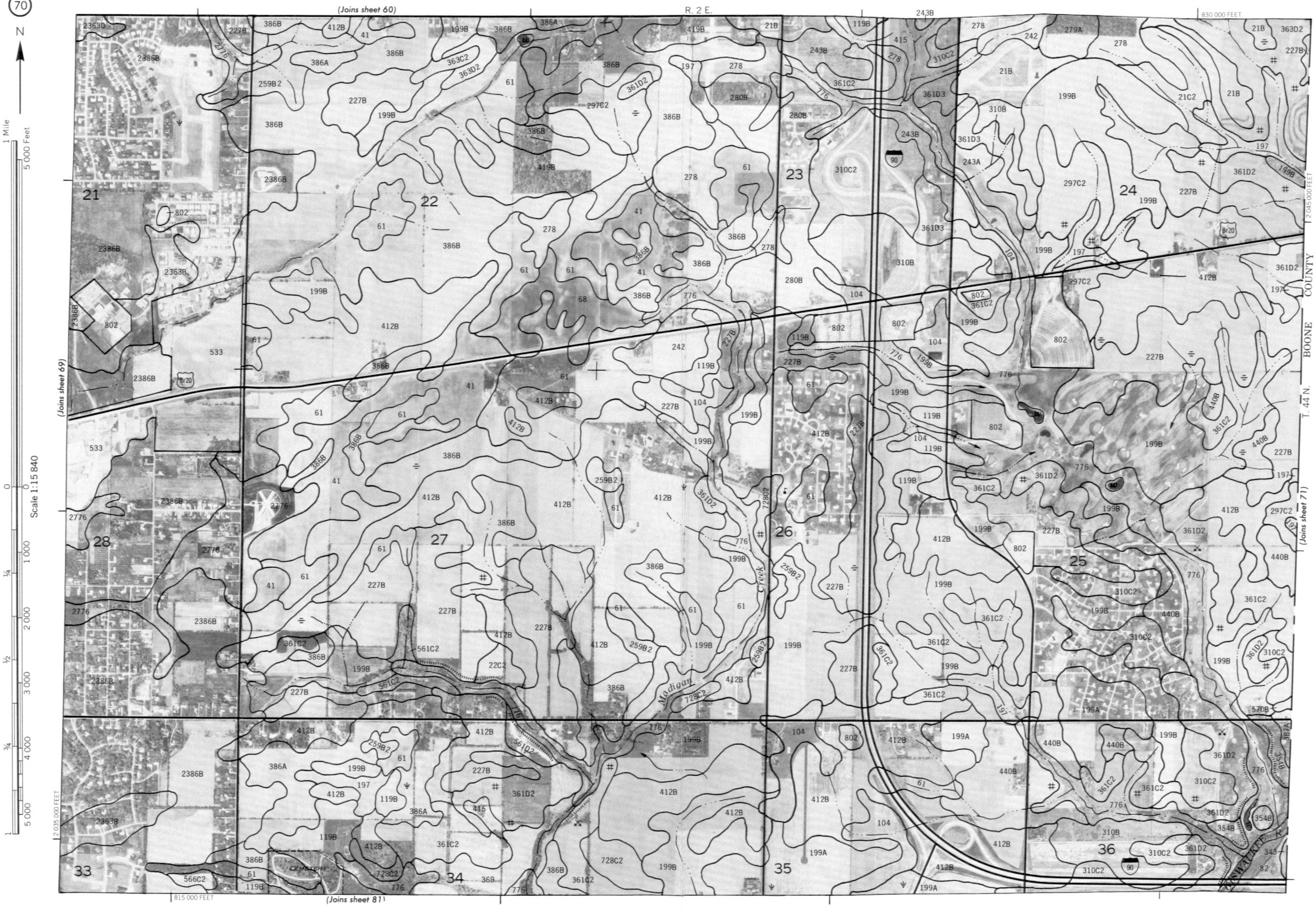



N
(Joins sheet 56)
R. 11 E.
775 000 FEET
(Joins sheet 65)
(Joins sheet 67)
T. 26 N.
2 045 000 FEET
2 040 000 FEET
(Joins sheet 77)
745 000 FEET
1 Mile
5 000 Feet
Scale 1:15 840
Winnebago
Coolidge
Creek
North
Fork
Kent
water

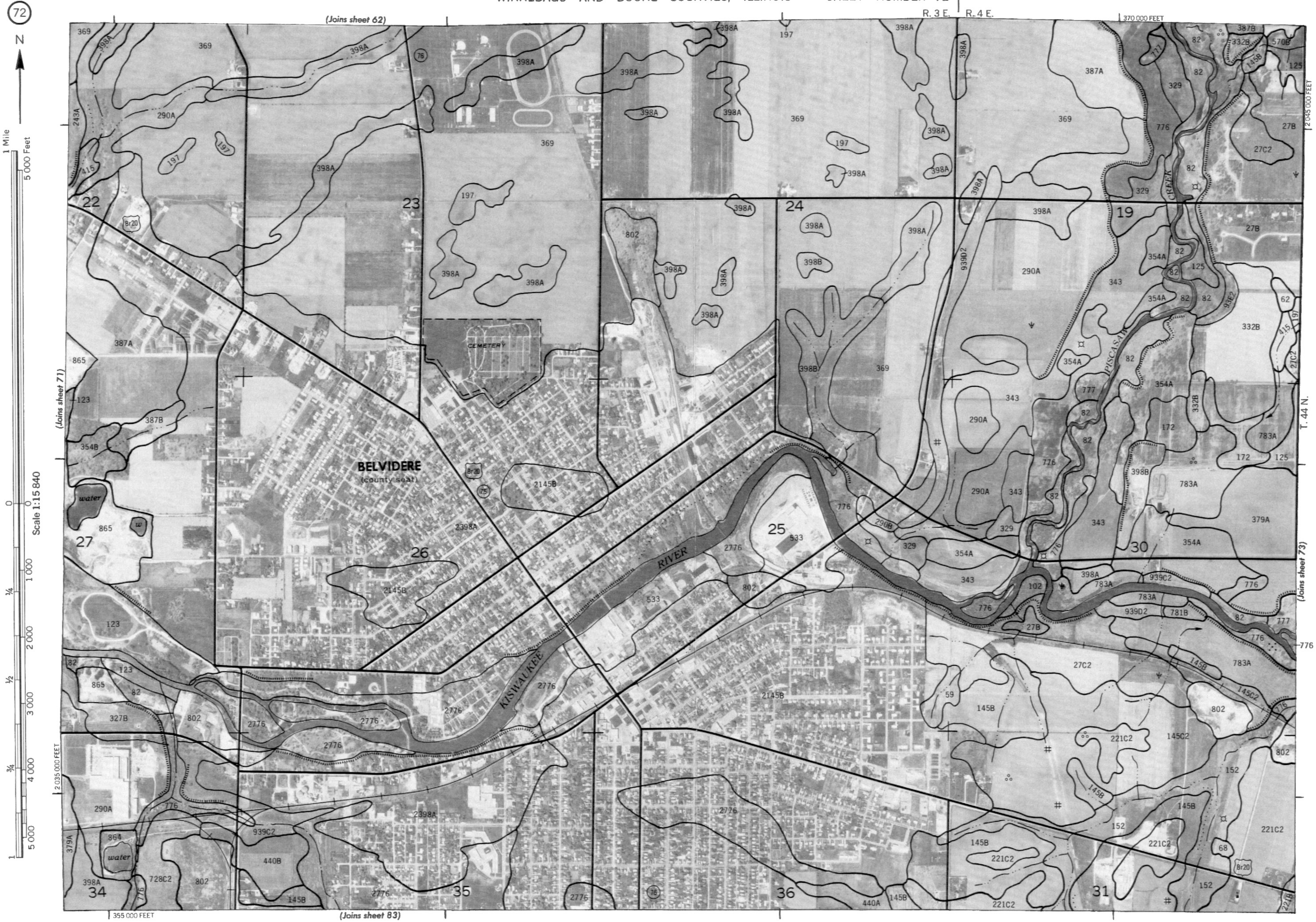

67
N
(Joins sheet 57)
(Joins sheet 66)
(Joins sheet 68)
(Joins sheet 78)
R. 11 E.
R. 1 E.
T. 26 N.
T. 44 N.
760 000 FEET
775 000 FEET
2 045 000 FEET
2 040 000 FEET
THIRD PRINCIPAL MERIDIAN
CEMETERY
Kent Creek
South Fork
water
1 Mile
5 000 Feet
Scale 1:15 840
0
1000
2000
3000
4000
5000
¼
½
¾
1

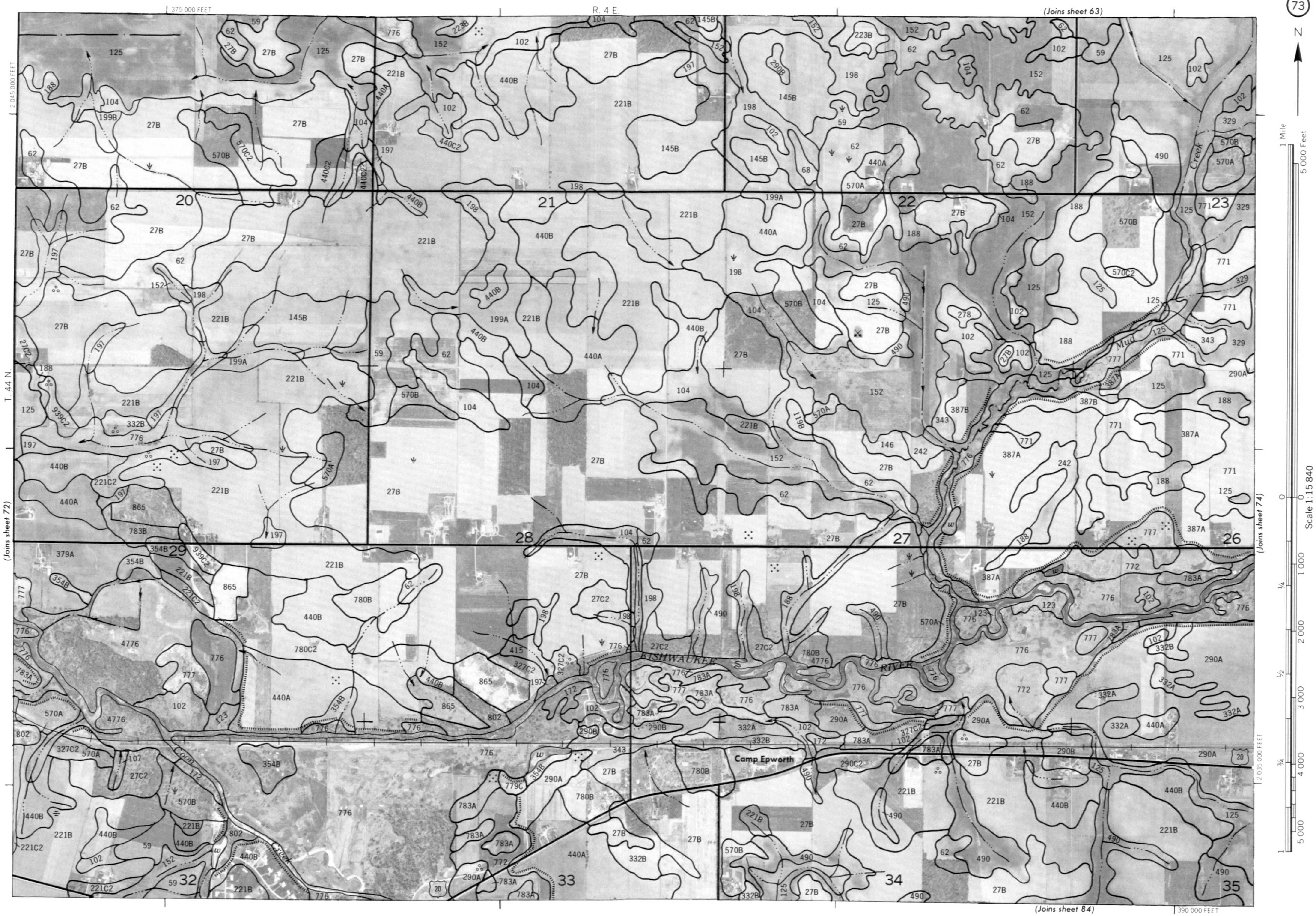

68
N
(Joins sheet 58)
R. 1 E.
790 000 FEET
2 045 000 FEET
T. 44 N.
(Joins sheet 69)
(Joins sheet 67)
(Joins sheet 78)
(Joins sheet 79)
780 000 FEET
2 035 000 FEET
1 Mile
5 000 Feet
Scale 1:15 840
ROCKFORD
(county seat)
ROCK
RIVER
South
Fork
Kent
Creek
North
Fork
Kent
Creek
LEVINGS
STATE
PARK
water
water
Montague
Island
Denton
Island
20
21
22
25
26
27
28
29
32
33
34
35
2566B
2776
2781B
2386B
533
2783A
2363B
2398A
2354A
2363D
280C2
566D2
361D2
386A
152
561C2
419C2
504E
243C2
776
505E2
561D2
504C
429B
429C2
363C2
243B
280B
506C2
566D2
864
4776
728C2
36B
36A
41
297C2
2363D
2363B


69
N
295 000 FEET
R. 1 E.
R. 2 E.
(Joins sheet 59)
2 045 000 FEET
T. 44 N.
(Joins sheet 68)
(Joins sheet 70)
(Joins sheet 80)
810 000 FEET
2 035 000 FEET
ROCKFORD
(county seat)
Keith Creek
51
Br 20
19
20
21
24
25
28
29
30
31
32
33
36
2354A
802
2363B
2781B
2386B
2363D
2776
2566B
2783A
533
2398A
1 Mile
5 000 Feet
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾
1
Scale 1:15 840

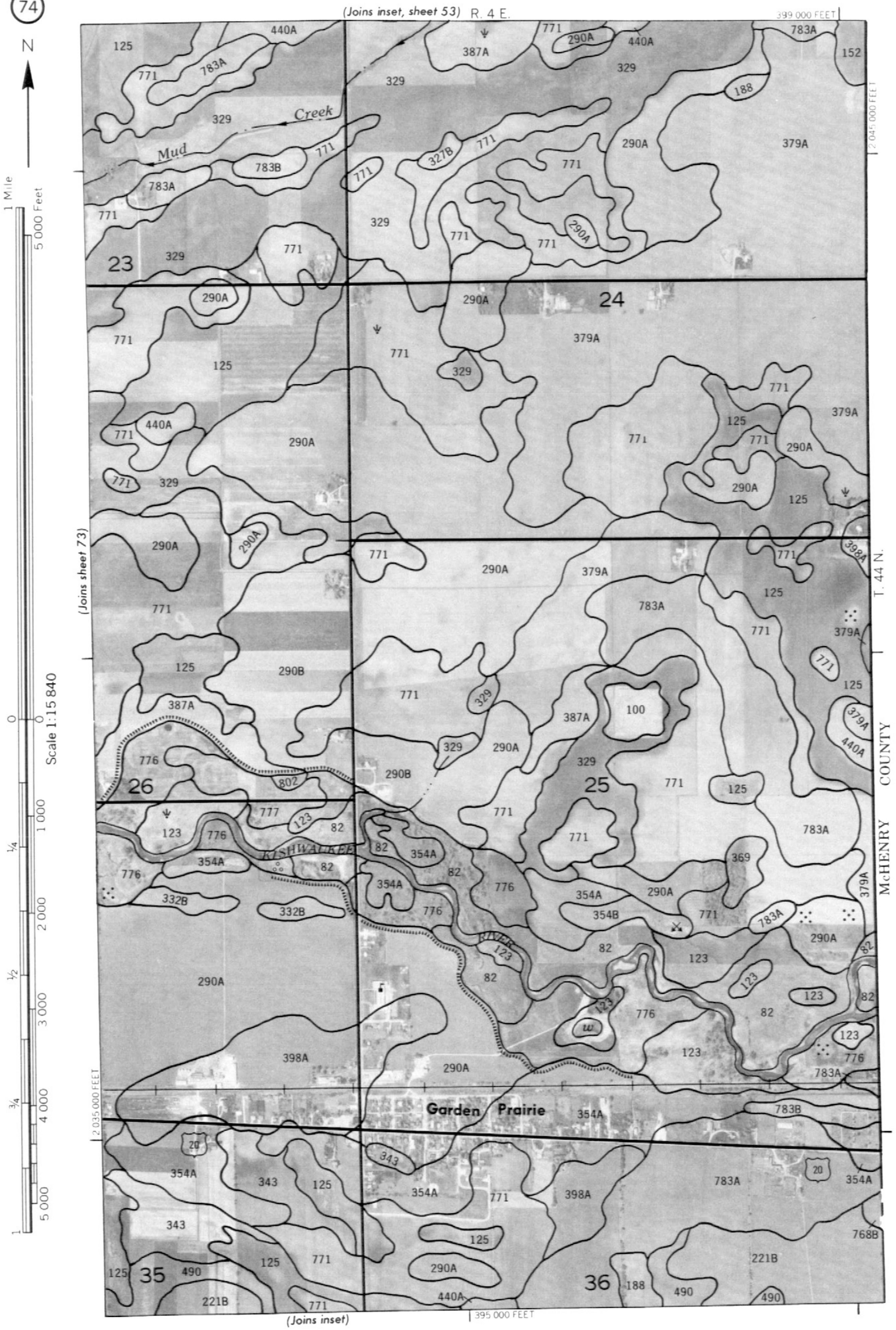

N
(Joins sheet 60)
R. 2 E.
830 000 FEET
2 045 000 FEET
BOONE COUNTY
T. 44 N.
(Joins sheet 71)
(Joins sheet 69)
(Joins sheet 81)
815 000 FEET
2 035 000 FEET
1 Mile
5 000 Feet
Scale 1:15 840
21
22
23
24
25
26
27
28
33
34
35
36
Madigan
Creek
CEMETERY
90
Br20

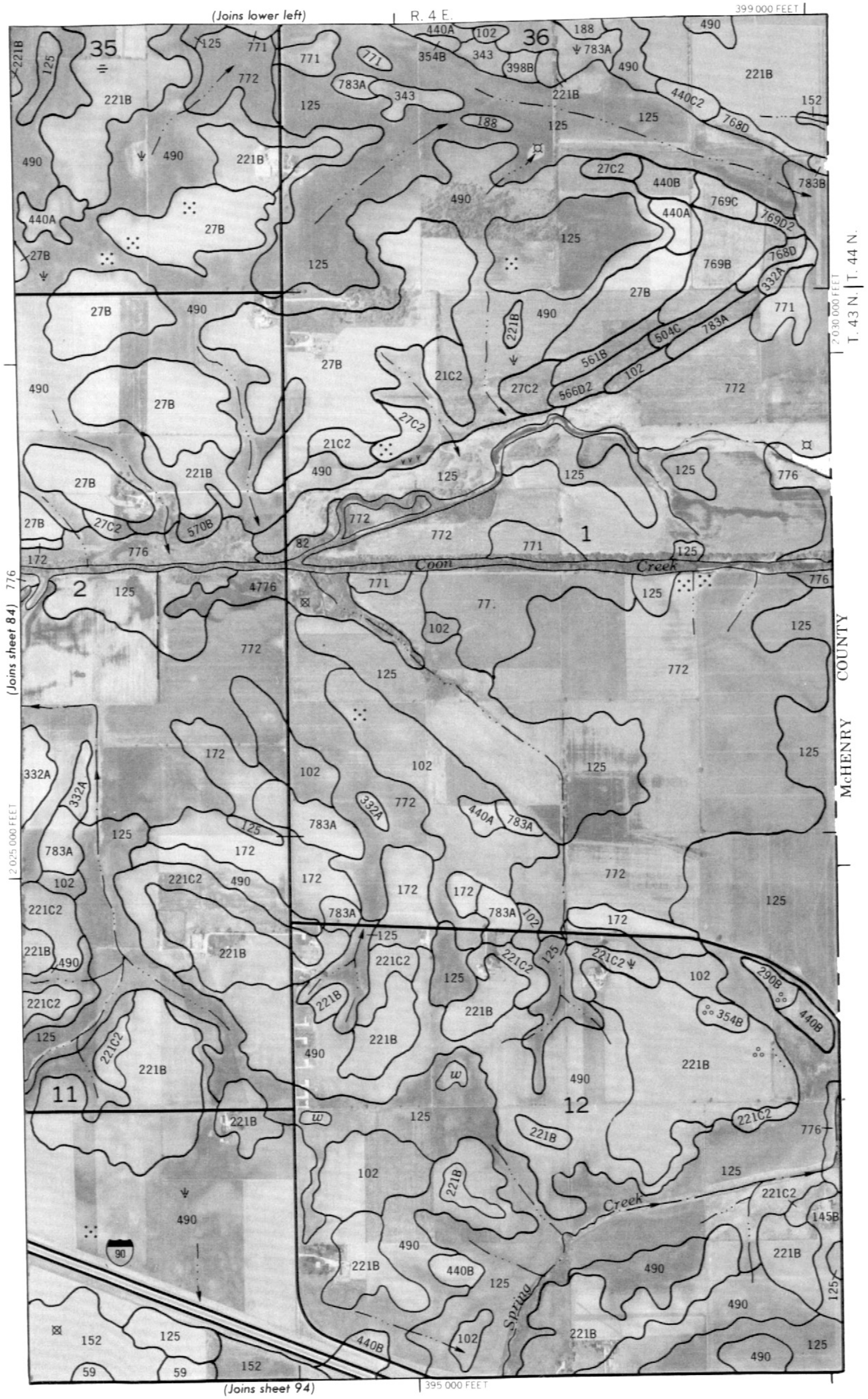

71
N
(Joins sheet 61)
(Joins sheet 70)
(Joins sheet 72)
340 000 FEET
2 045 000 FEET
2 035 000 FEET
R. 3 E.
T. 44 N.
WINNEBAGO COUNTY
Beaver Creek
KISHWAUKEE RIVER
water
19
20
21
22
27
28
29
30
31
32
33
34
Scale 1:15 840
1 Mile
5 000 Feet


72
N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 62)
(Joins sheet 71)
(Joins sheet 73)
(Joins sheet 83)
R. 3 E.
R. 4 E.
T. 44 N.
370 000 FEET
2 045 000 FEET
2 035 000 FEET
355 000 FEET
BELVIDERE
(county seat)
CEMETERY
KISWAUKEE
RIVER
PISCASAW
CREEK
water

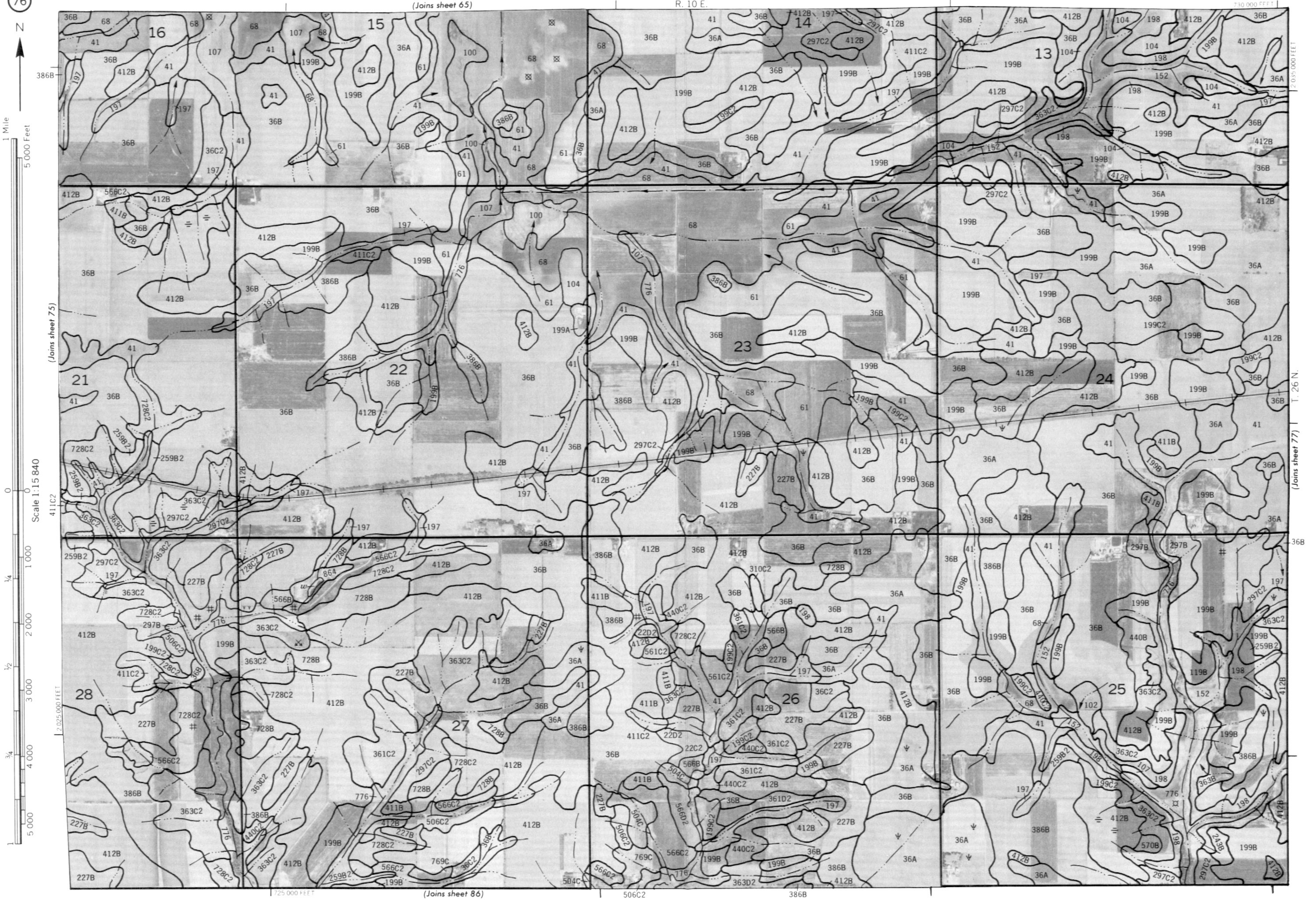


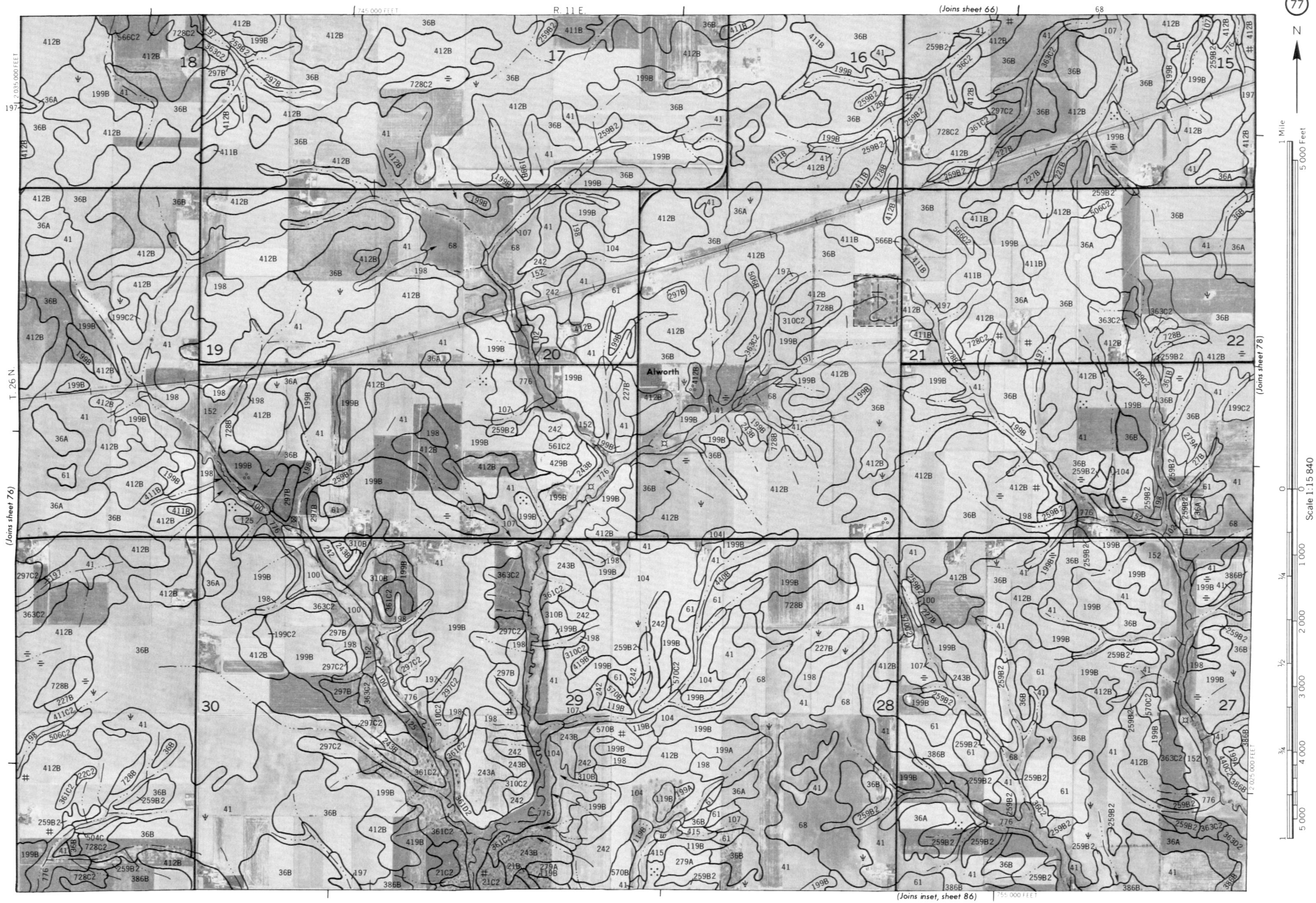
This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

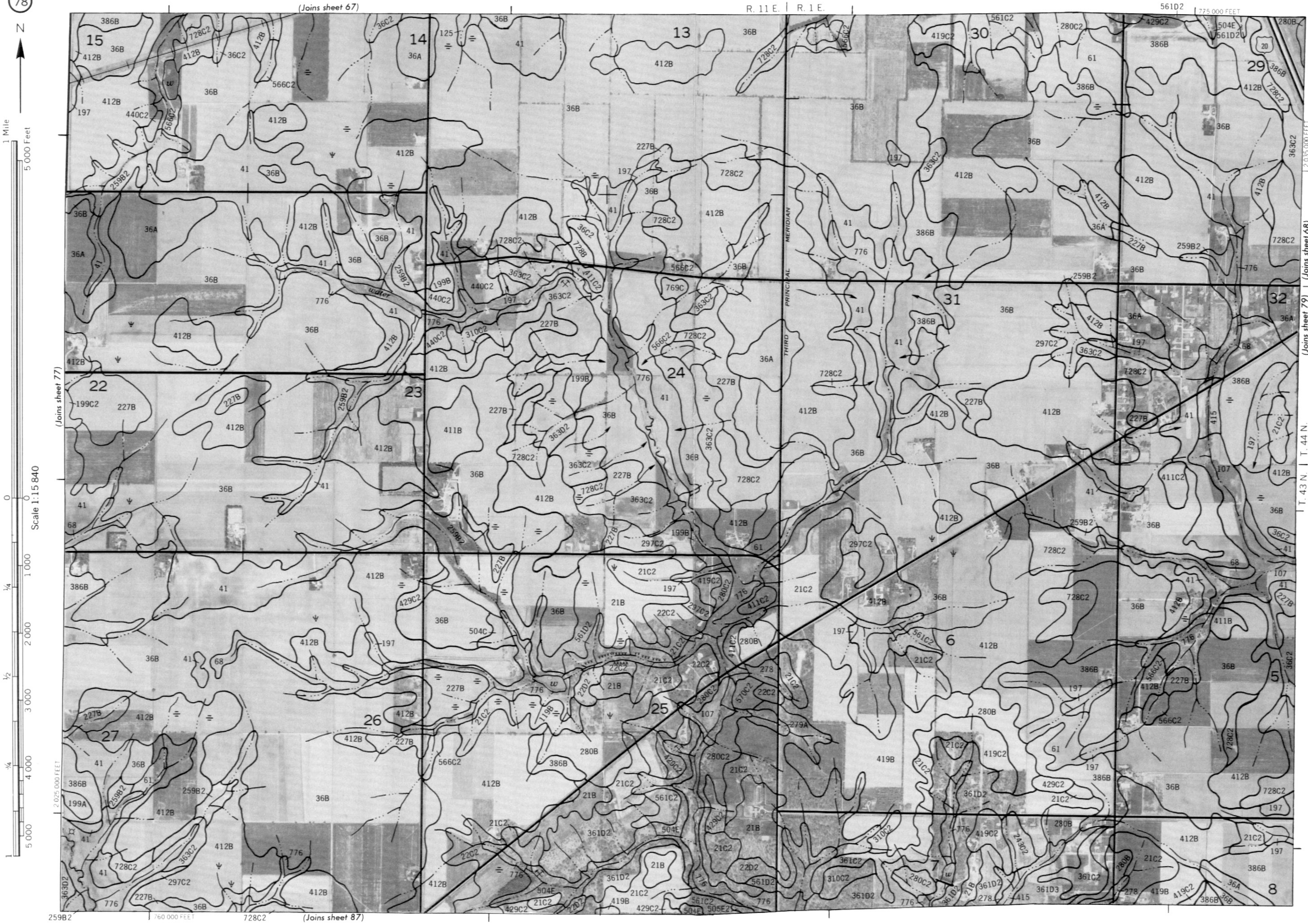

N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins inset, sheet 53)
R. 4 E.
399 000 FEET
2 045 000 FEET
Mud
Creek
23
24
25
26
35
36
KISHWAUKEE
RIVER
Garden Prairie
(Joins sheet 73)
T. 44 N.
McHENRY COUNTY
2 035 000 FEET
(Joins inset)
395 000 FEET

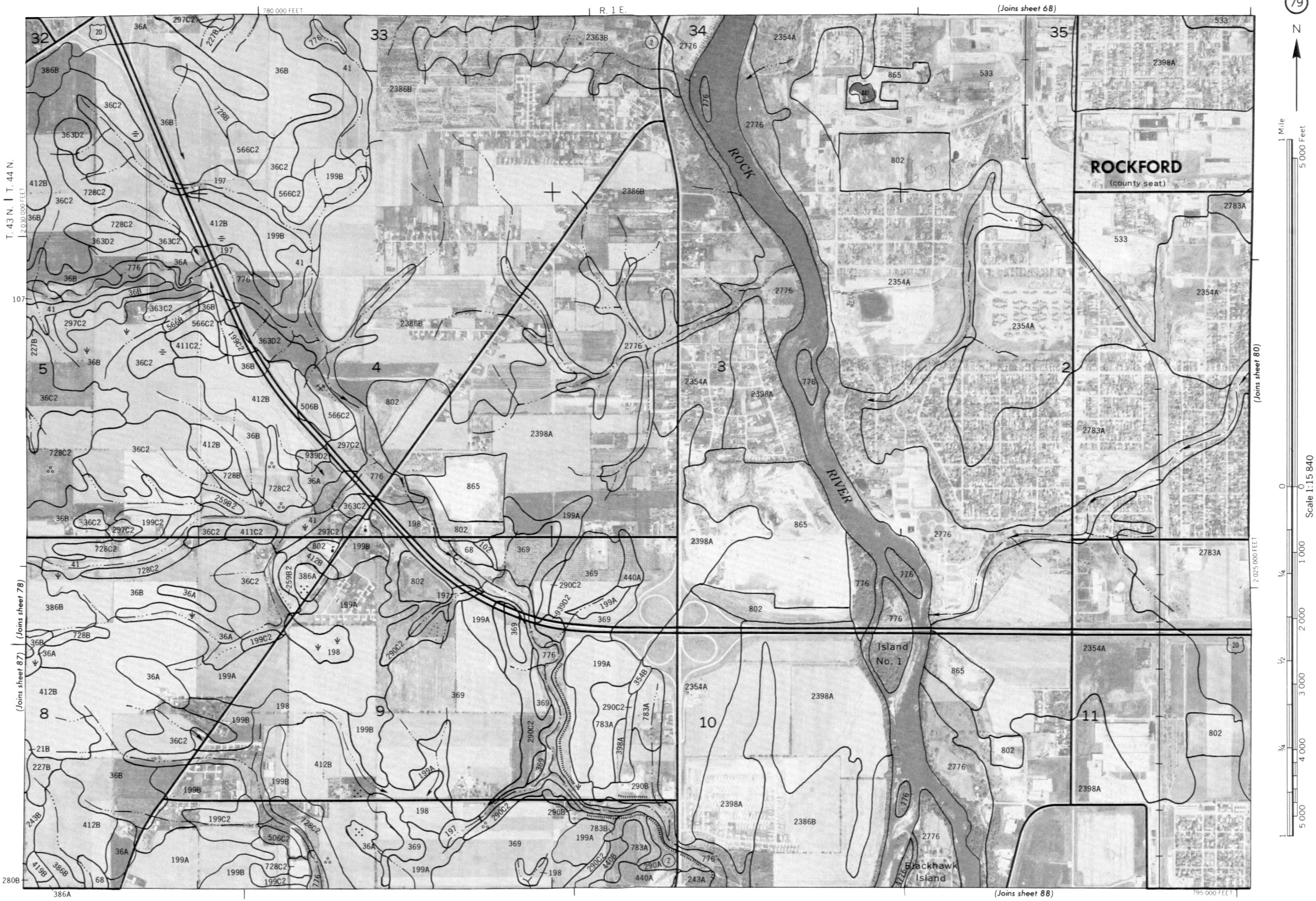

(Joins lower left)
R. 4 E.
399 000 FEET
35
36
1
2
11
12
Coon
Creek
Spring
Creek
T. 44 N.
T. 43 N.
2 030 000 FEET
(Joins sheet 84)
2 025 000 FEET
McHENRY COUNTY
(Joins sheet 94)
395 000 FEET

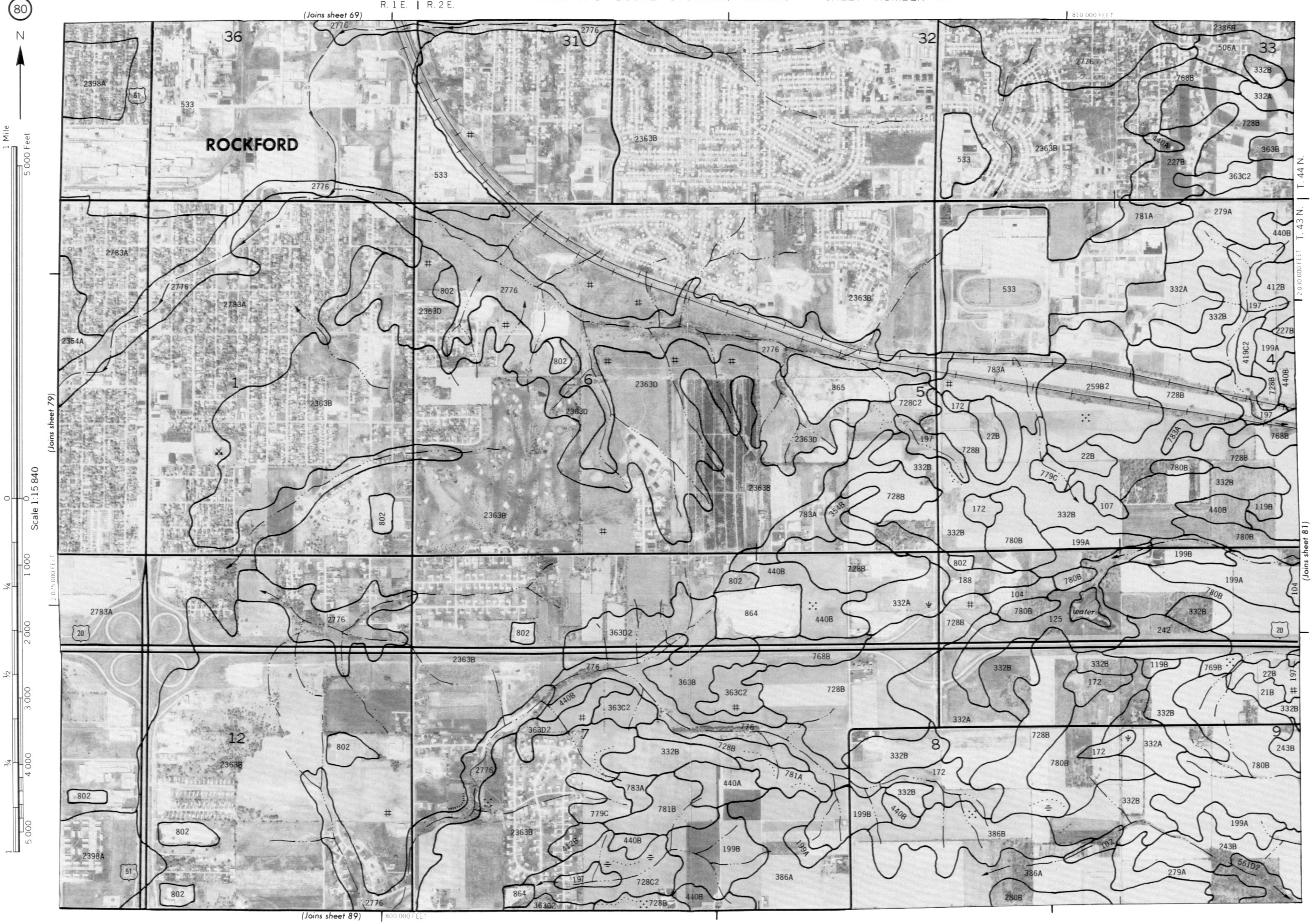

75
705 000 FEET
2 035 000 FEET
197
R. 10 E.
(Joins sheet 64)
(Joins sheet 76)
(Joins sheet 85)
T. 26 N.
STEPHENSON
Seward
water
18
17
16
19
20
21
30
29
28
2 025 000 FEET
720 000 FEET
769D2
N
1 Mile
5 000 Feet
Scale 1:15 840

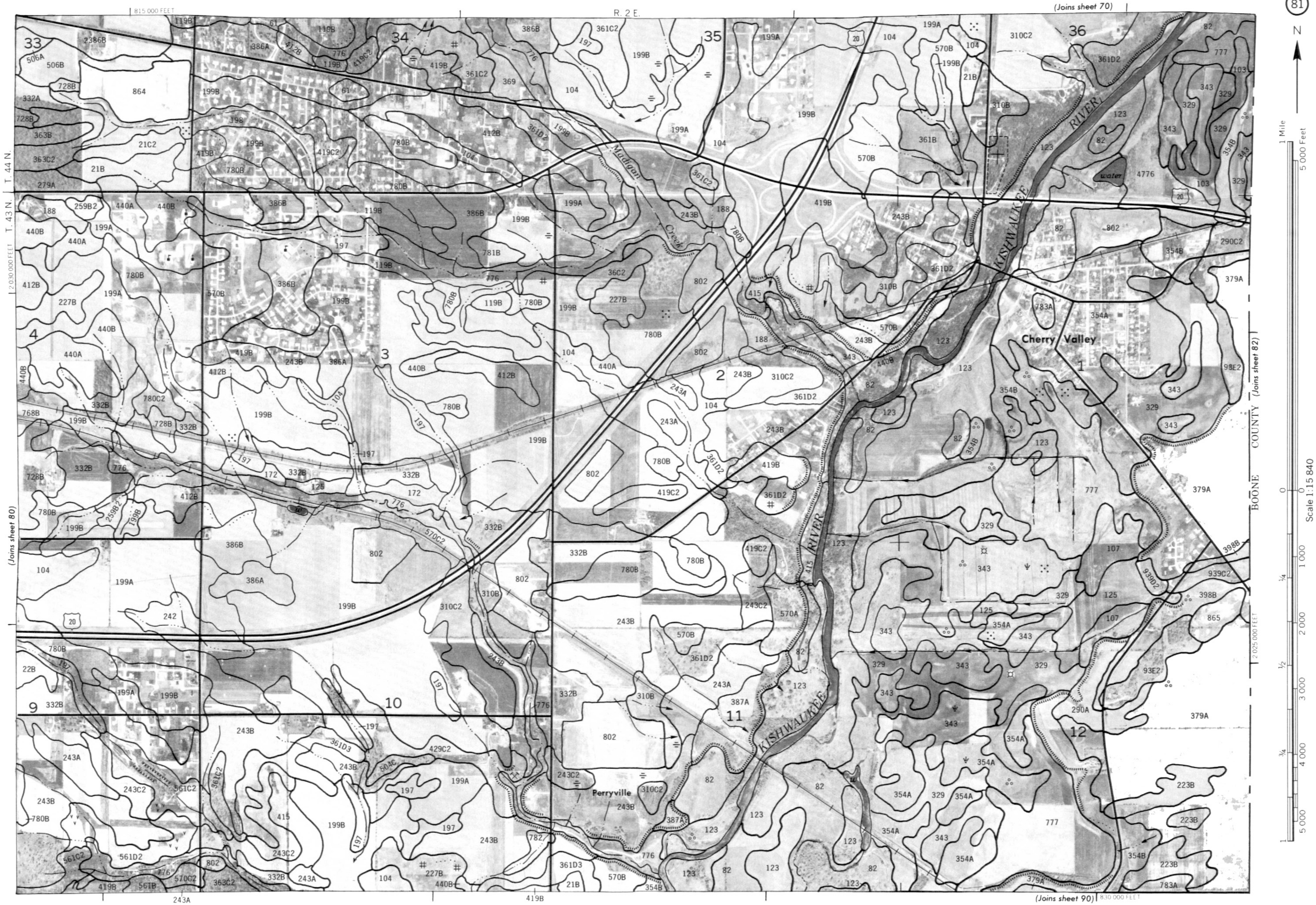

(Joins sheet 65)
R. 10 E.
730 000 FEET
2 035 000 FEET
(Joins sheet 75)
(Joins sheet 77)
T. 26 N.
2 025 000 FEET
725 000 FEET
(Joins sheet 86)
N
1 Mile
5 000 Feet
Scale 1:15 840
16
15
14
13
21
22
23
24
28
27
26
25

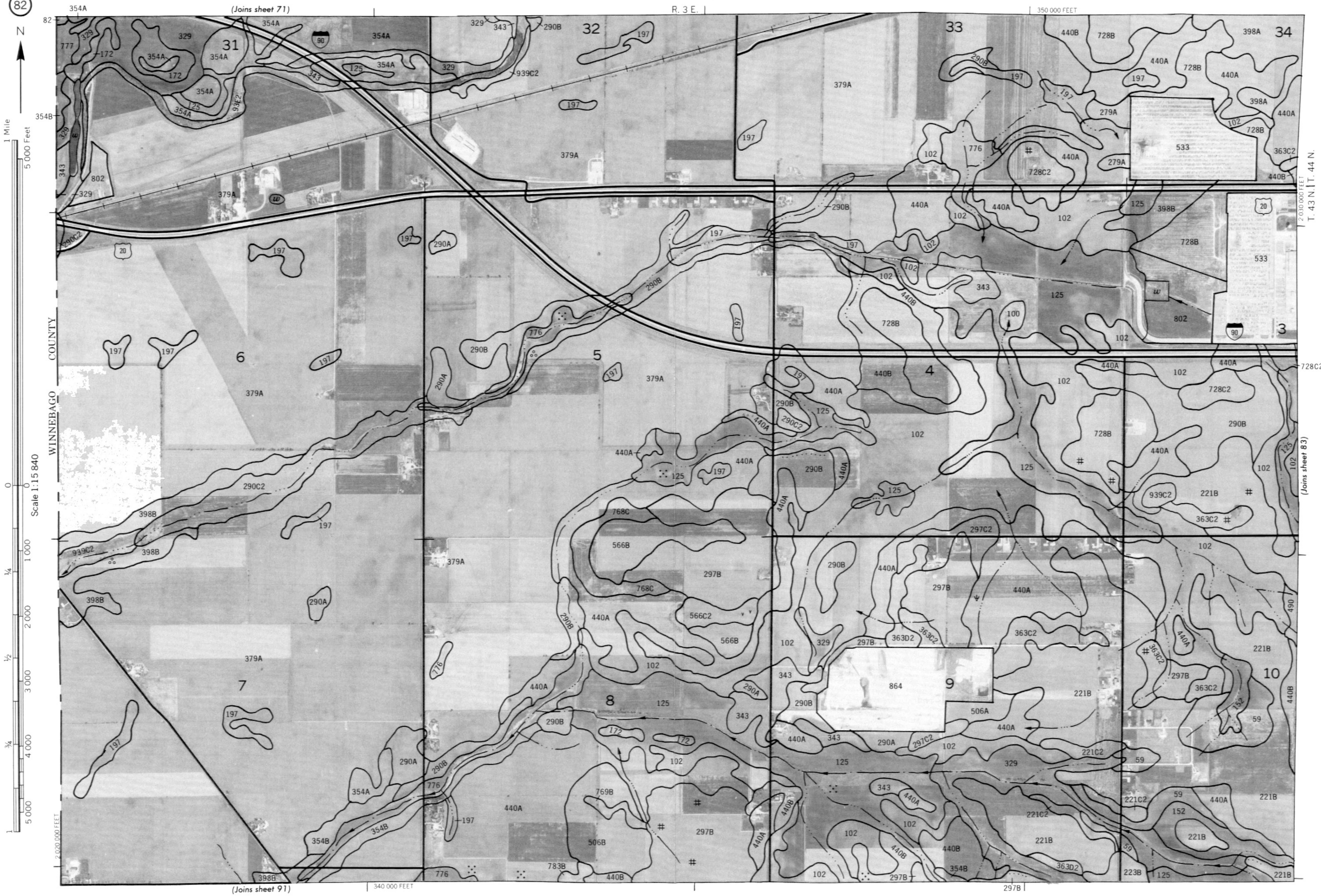

77
N
(Joins sheet 66)
R. 11 E.
745 000 FEET
2 035 000 FEET
T. 26 N.
(Joins sheet 76)
(Joins sheet 78)
(Joins inset, sheet 86)
755 000 FEET
2 025 000 FEET
Alworth
15
16
17
18
19
20
21
22
27
28
29
30
1 Mile
5 000 Feet
Scale 1:15 840


(Joins sheet 67)
R. 11 E. | R. 1 E.
561D2
775 000 FEET
N
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾
(Joins sheet 77)
(Joins sheet 68)
(Joins sheet 79)
T. 44 N.
T. 43 N.
2 035 000 FEET
2 025 000 FEET
THIRD PRINCIPAL MERIDIAN
760 000 FEET
(Joins sheet 87)
15
14
13
30
29
22
23
24
31
32
27
26
25
6
5
8
water
20

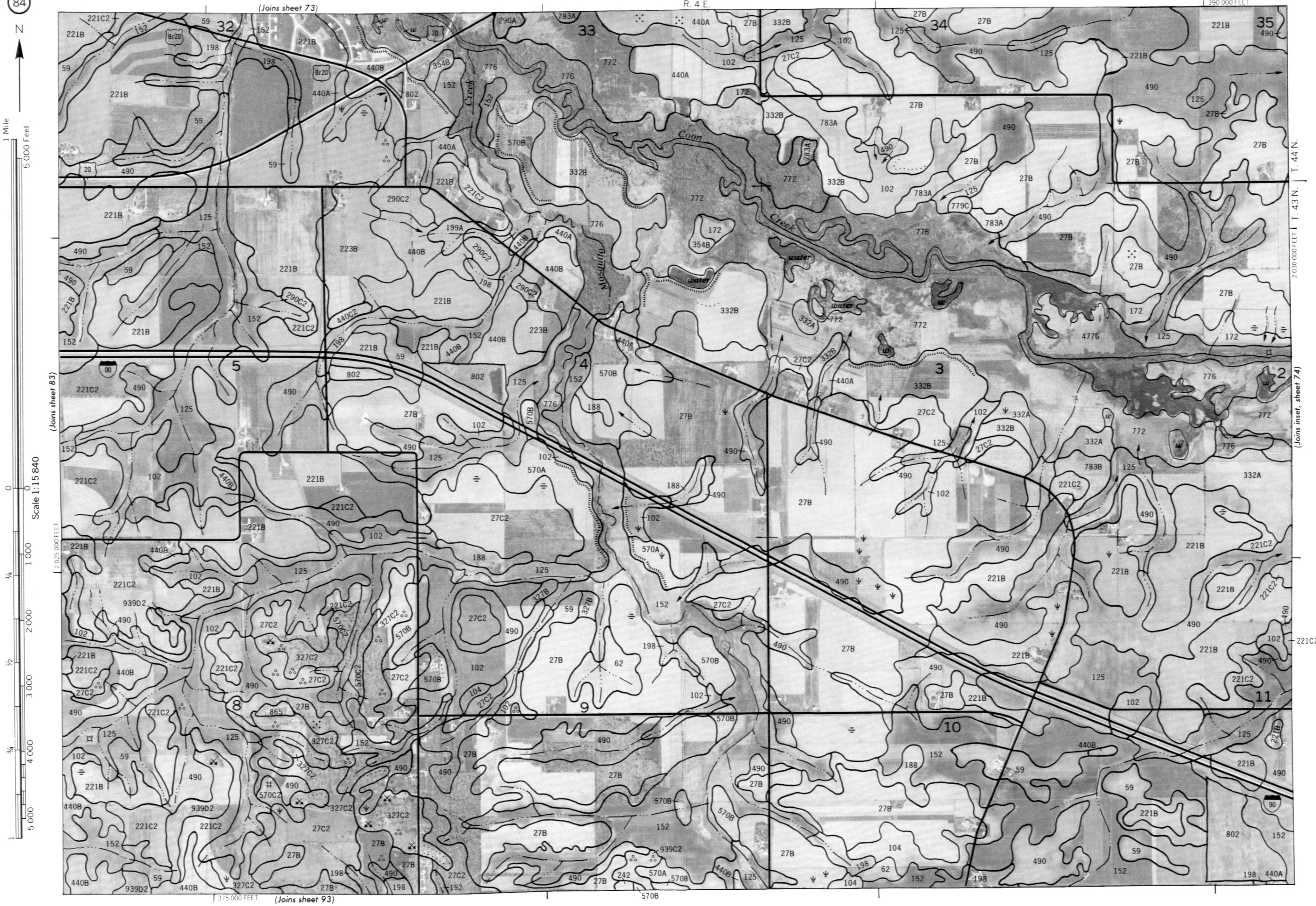

79
N
(Joins sheet 68)
(Joins sheet 80)
(Joins sheet 88)
(Joins sheet 78)
(Joins sheet 87)
780 000 FEET
795 000 FEET
2 030 000 FEET
2 025 000 FEET
R. 1 E.
T. 43 N. | T. 44 N.
ROCKFORD
(county seat)
ROCK
RIVER
Island
No. 1
Blackhawk
Island
1 Mile
5 000 Feet
Scale 1:15 840

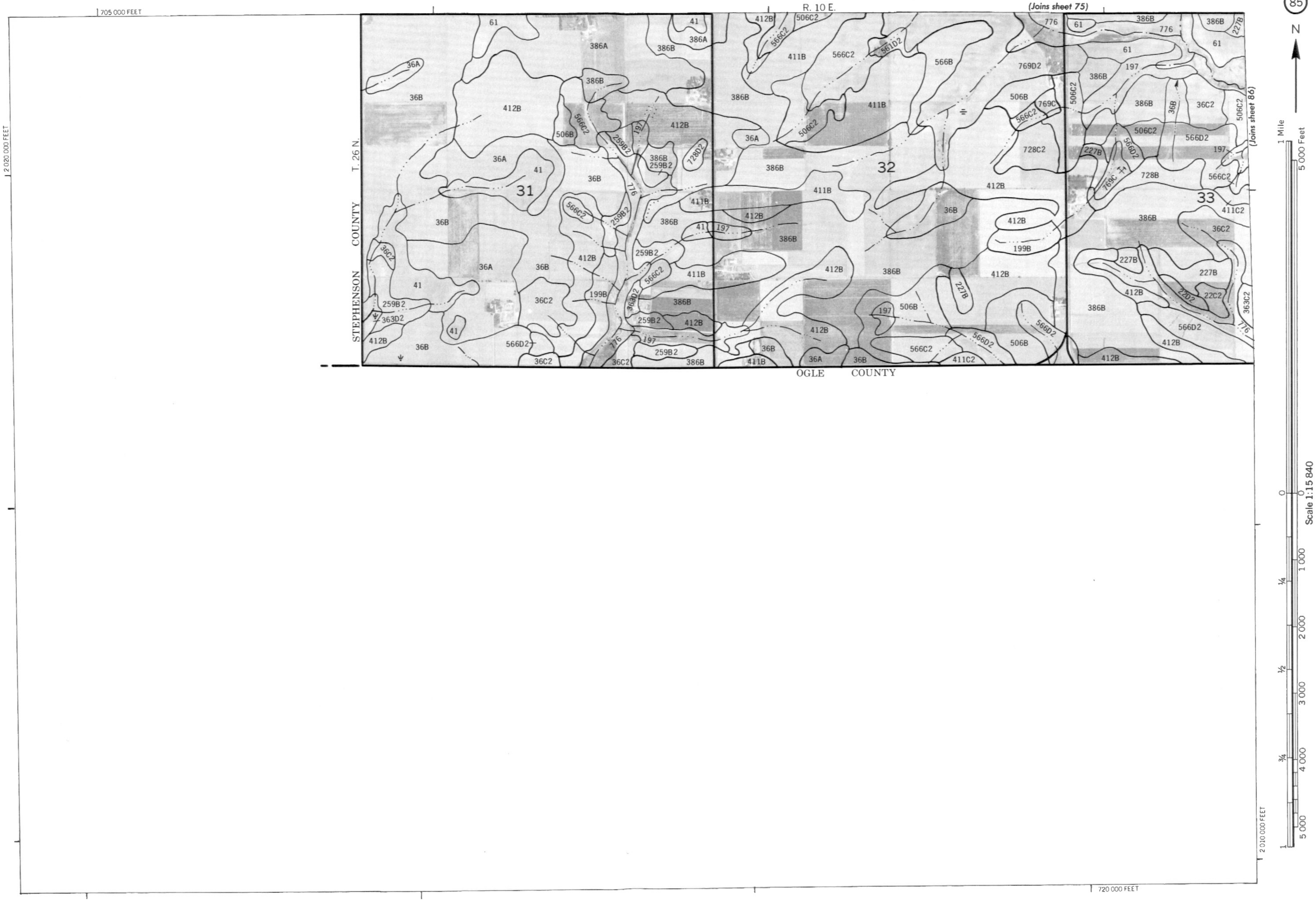

N
R. 1 E.
R. 2 E.
(Joins sheet 69)
(Joins sheet 79)
(Joins sheet 81)
(Joins sheet 89)
810 000 FEET
800 000 FEET
2 030 000 FEET
2 025 000 FEET
T. 44 N.
T. 43 N.
ROCKFORD
36
31
32
33
1
6
5
4
12
7
8
9
2776
2398A
533
2363B
2386B
506A
332B
768B
332A
728B
440A
363B
227B
363C2
781A
279A
440B
412B
197
227B
199A
419C2
728B
783A
259B2
2783A
2354A
802
2363D
865
728C2
172
22B
768B
779C
107
780B
119B
783A
354B
199B
188
104
125
water
242
864
363D2
776
363C2
769B
21B
332A
243B
783A
781B
779C
412B
440B
386B
199B
199A
102
386A
561D2
280B
864
728C2
440B
Scale 1:15 840
1 Mile
5 000 Feet
0
1000
2000
3000
4000
5000
¼
½
¾
1

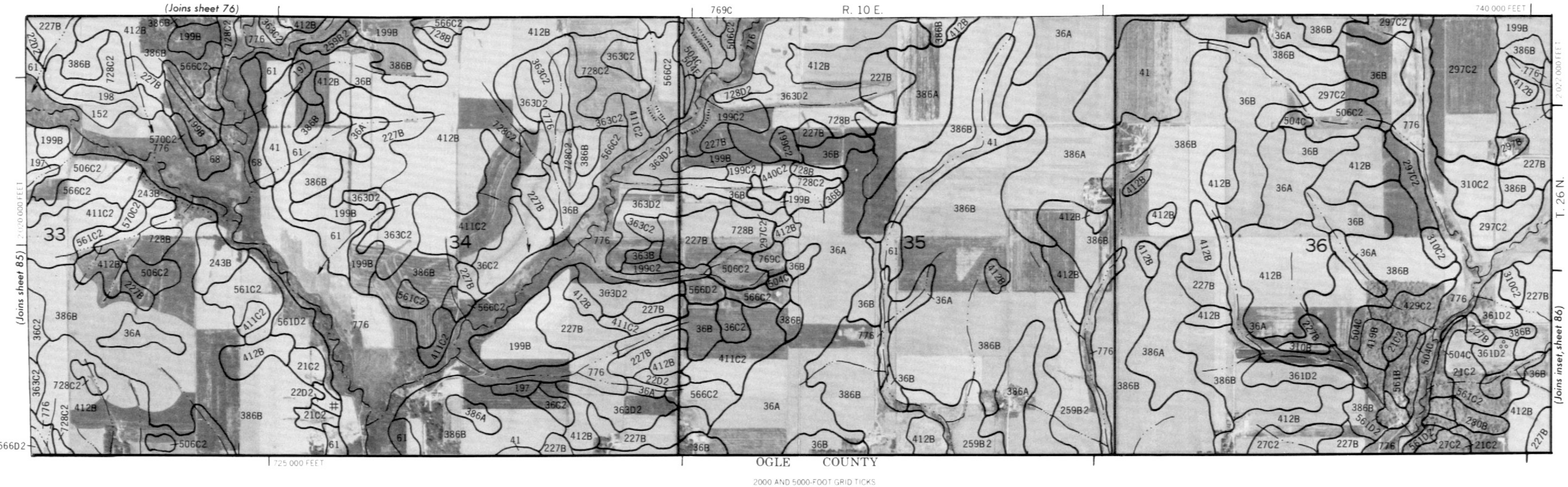

(Joins sheet 70)
(Joins sheet 80)
(Joins sheet 82)
(Joins sheet 90)
R. 2 E.
T. 44 N.
T. 43 N.
815 000 FEET
830 000 FEET
2 030 000 FEET
2 025 000 FEET
BOONE COUNTY
Cherry Valley
Perryville
KISHWAUKEE RIVER
Madigan Creek
N
1 Mile
5 000 Feet
Scale 1:15 840

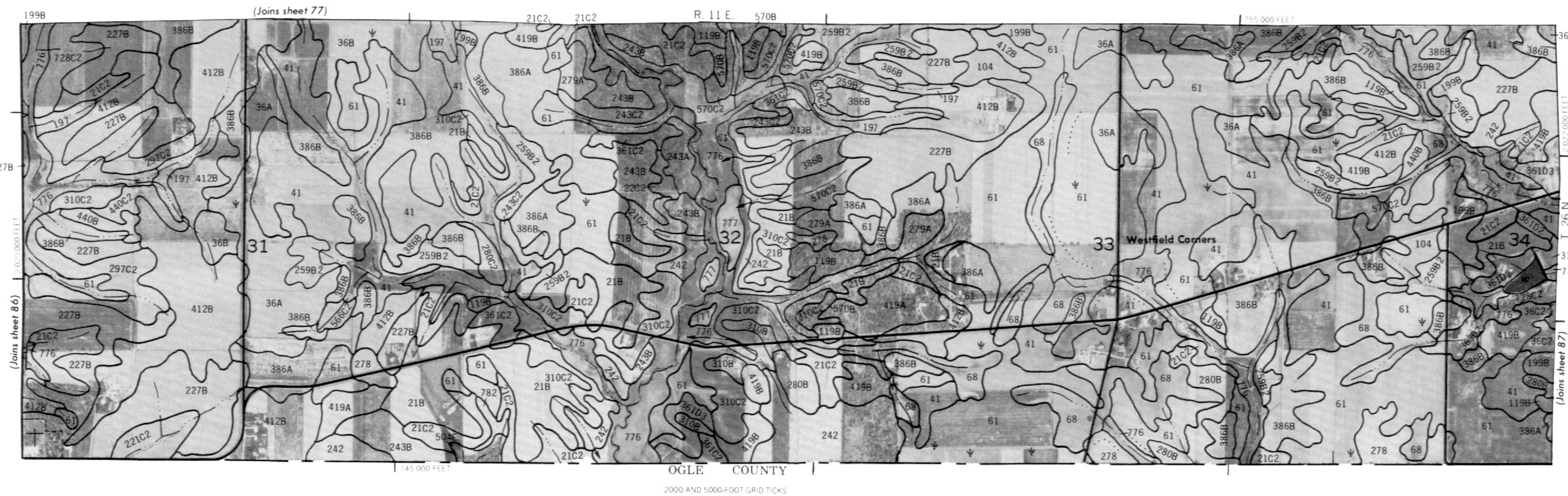

(Joins sheet 71)
R. 3 E.
350 000 FEET
N
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾
1
WINNEBAGO COUNTY
T. 44 N.
T. 43 N.
2 030 000 FEET
2 020 000 FEET
(Joins sheet 83)
(Joins sheet 91)
340 000 FEET
31
32
33
34
6
5
4
3
7
8
9
10
20
90
379A
440A
290B
728B
290C2
125
102
197
864
533
802


83
N
355 000 FEET
R. 3 E. | R. 4 E.
(Joins sheet 72)
(Joins sheet 82)
(Joins sheet 84)
(Joins sheet 92)
370 000 FEET
2 030 000 FEET
2 025 000 FEET
T. 44 N.
T. 43 N.
BELVIDERE
(county seat)
34
35
36
31
3
2
1
6
10
11
12
7
20
90
1 Mile
5 000 Feet
Scale 1:15 840
0
1/4
1/2
3/4
1 000
2 000
3 000
4 000
5 000
398A
440A
440B
102
125
221B
802
2145B
2776
145B
59
152
490
533
398A
145B
363B
198
290C2
221C2
290B
188
440A
243B
223B
776
100
199B
293
146
62


(Joins sheet 73)
(Joins sheet 83)
(Joins inset, sheet 74)
(Joins sheet 93)
R. 4 E.
T. 44 N.
T. 43 N.
390 000 FEET
375 000 FEET
2 030 000 FEET
2 025 000 FEET
N
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1
1 000
2 000
3 000
4 000
5 000
Coon Creek
Mosquito Creek
water
32
33
34
35
5
4
3
2
8
9
10
11

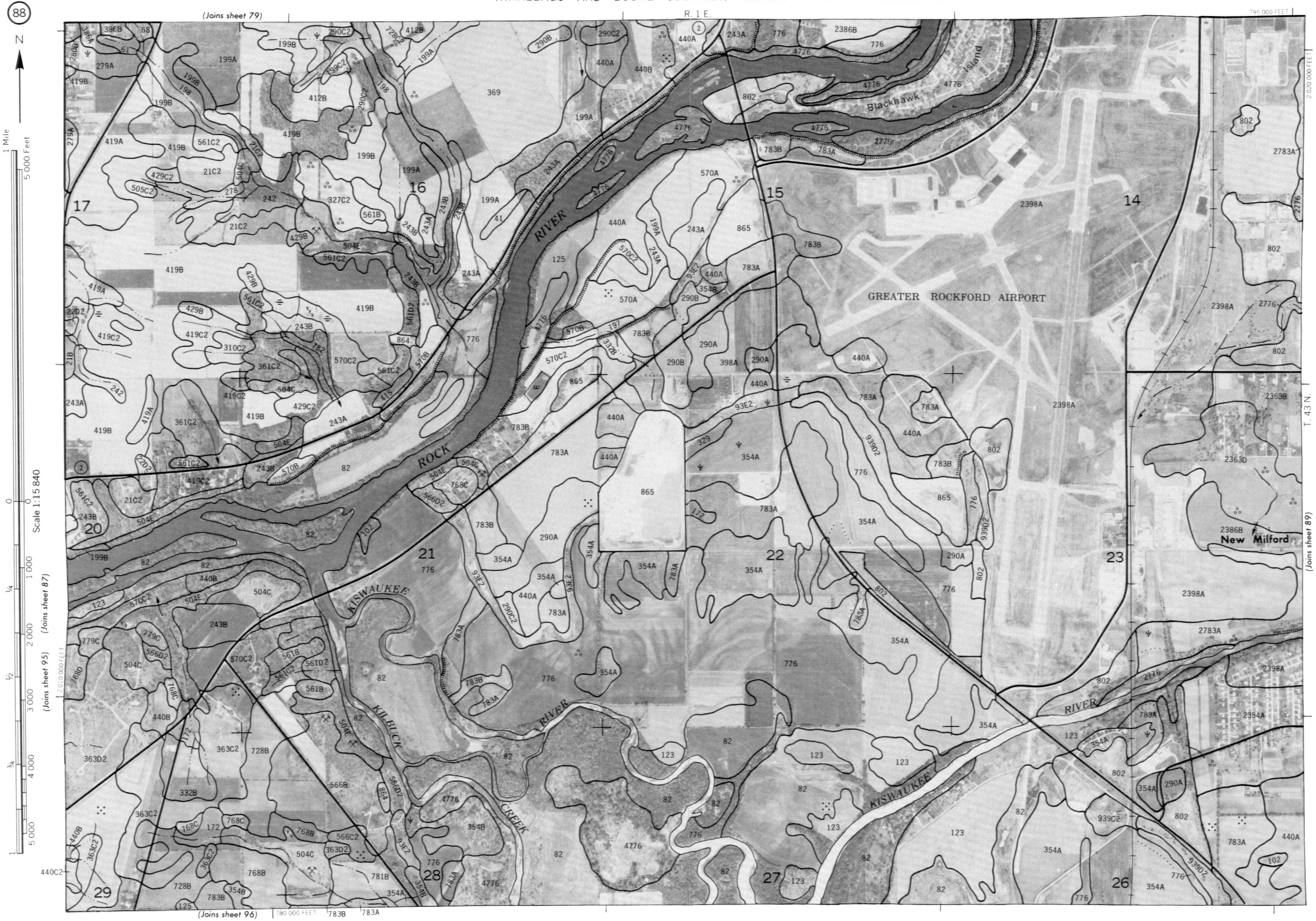

85
N
705 000 FEET
720 000 FEET
2 020 000 FEET
2 010 000 FEET
R. 10 E.
(Joins sheet 75)
(Joins sheet 86)
T. 26 N.
STEPHENSON COUNTY
OGLE COUNTY
31
32
33
1 Mile
5 000 Feet
Scale 1:15 840

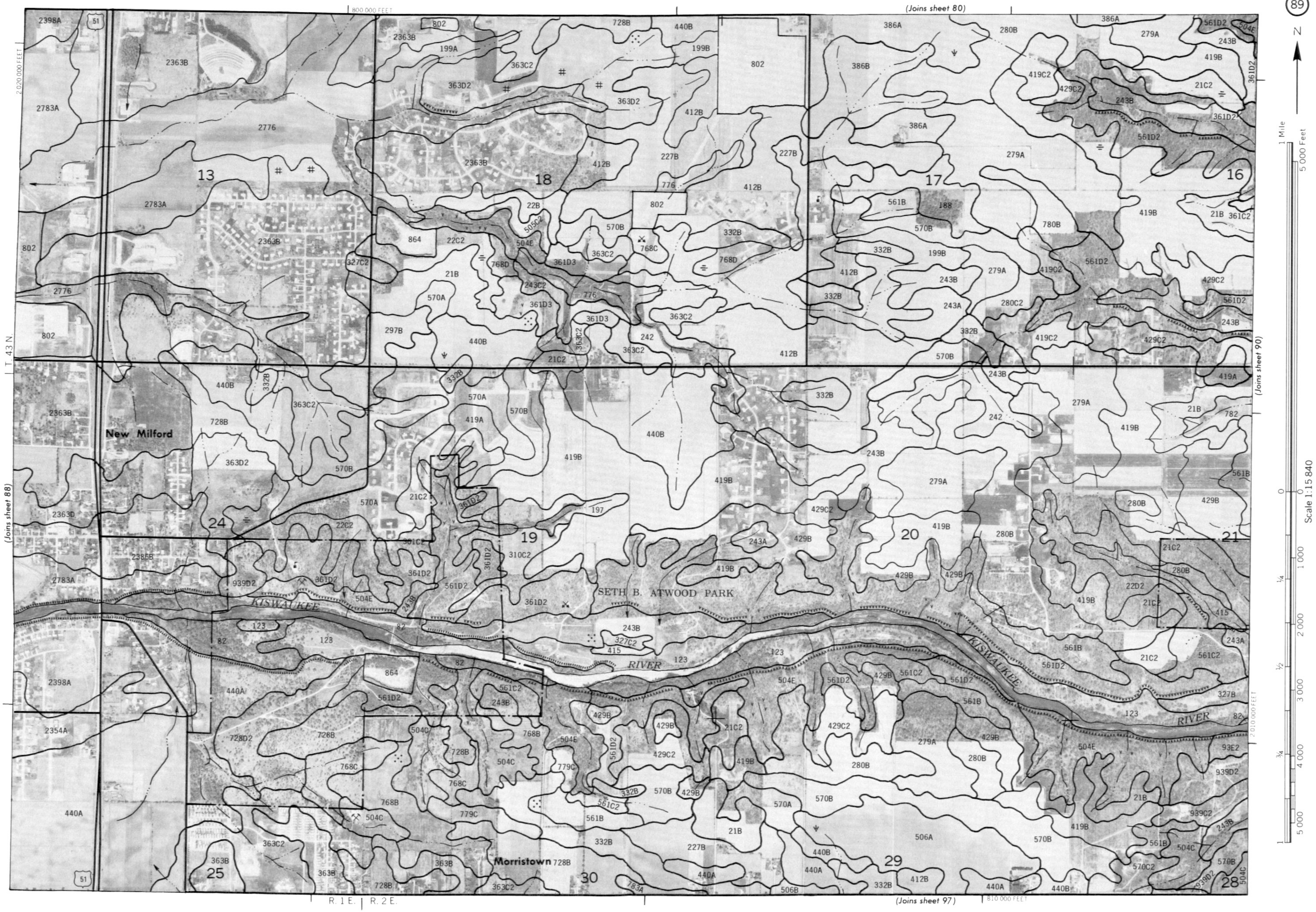

(Joins sheet 76)
R. 10 E.
T. 26 N.
(Joins sheet 85)
(Joins inset, sheet 86)
33
34
35
36
725 000 FEET
740 000 FEET
OGLE COUNTY
2000 AND 5000-FOOT GRID TICKS

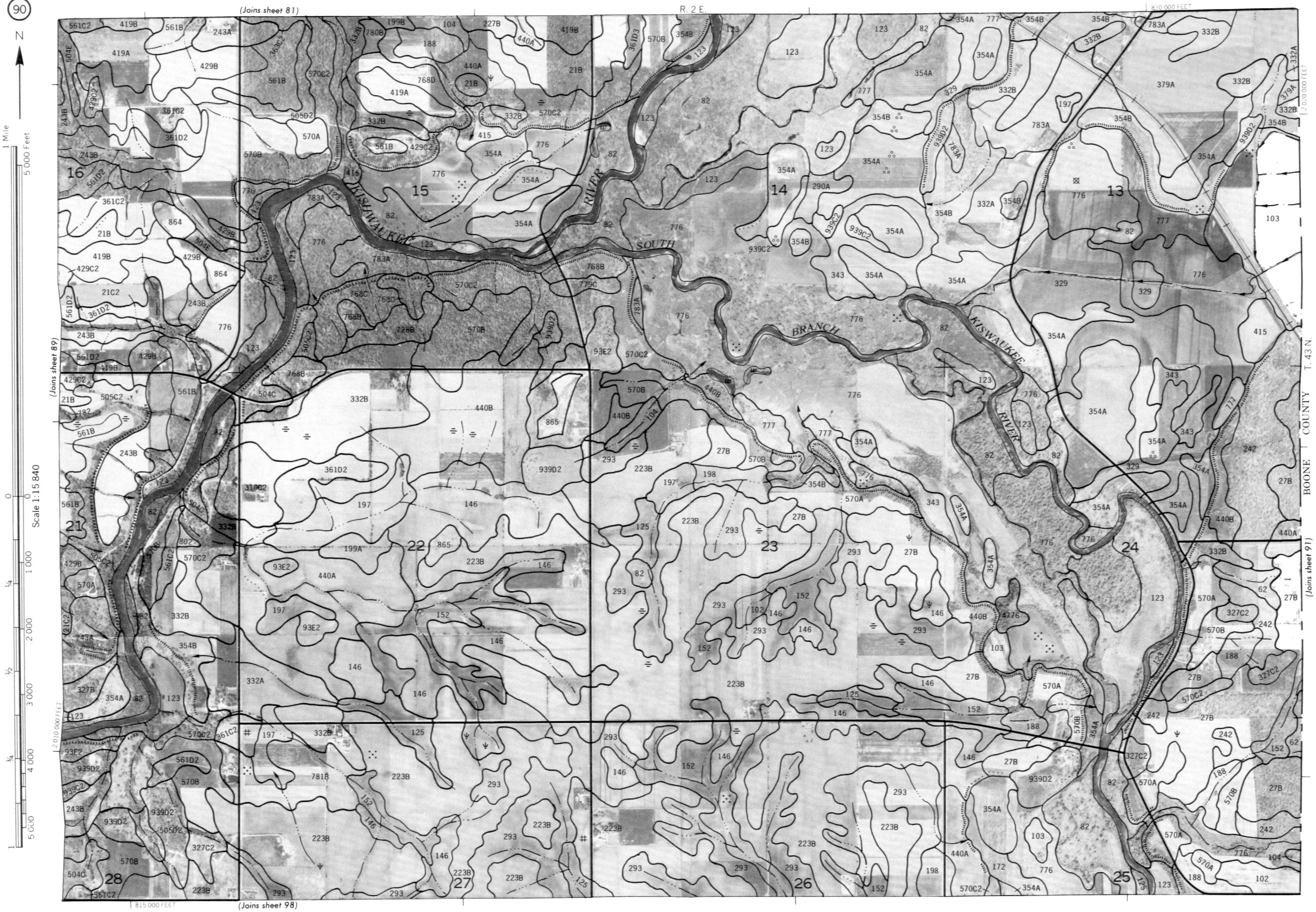

(Joins sheet 77)
R. 11 E.
T. 26 N.
(Joins sheet 86)
(Joins sheet 87)
31
32
33
34
Westfield Corners
745 000 FEET
755 000 FEET
OGLE COUNTY
2000 AND 5000-FOOT GRID TICKS

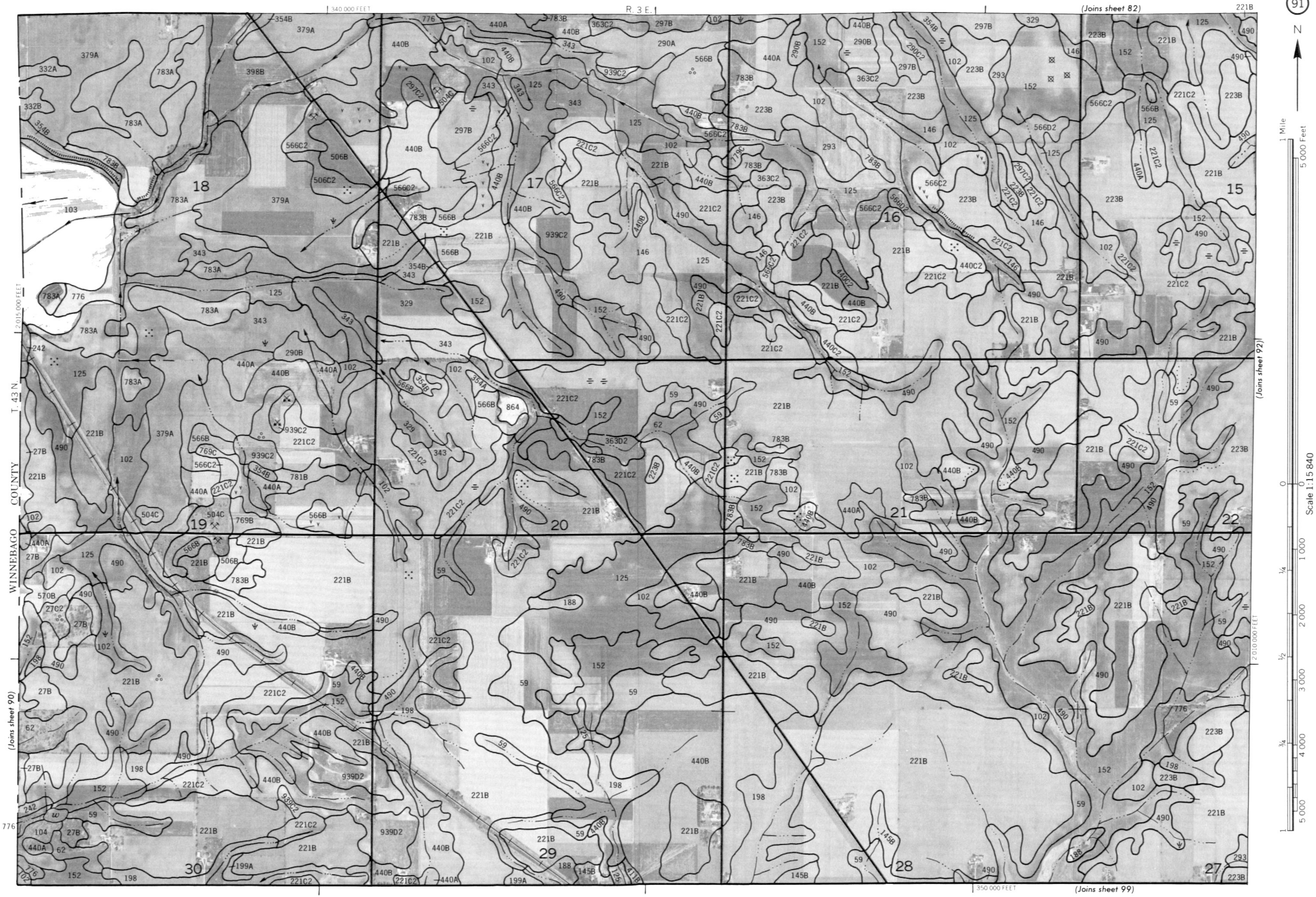

N
1 Mile
5 000 Feet
Scale 1:15 840


(Joins sheet 78)
(Joins sheet 79)
(Joins sheet 88)
(Joins sheet 95)
(Joins inset, sheet 86)
R. 11 E.
R. 1 E.
T. 26 N.
T. 43 N.
THIRD PRINCIPAL MERIDIAN
OGLE COUNTY
OGLE COUNTY
ROCK RIVER
34
35
36
7
8
18
17
19
20
760 000 FEET
775 000 FEET
2 020 000 FEET
2 015 000 FEET
N
1 Mile
5 000 Feet
Scale 1:15 840


88
N
(Joins sheet 79)
R. 1 E.
795 000 FEET
2 020 000 FEET
Blackhawk Island
ROCK RIVER
GREATER ROCKFORD AIRPORT
KISWAUKEE RIVER
KILBUCK CREEK
New Milford
T. 43 N.
(Joins sheet 89)
(Joins sheet 87)
(Joins sheet 95)
(Joins sheet 96)
2 010 000 FEET
780 000 FEET
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾
17
16
15
14
20
21
22
23
29
28
27
26

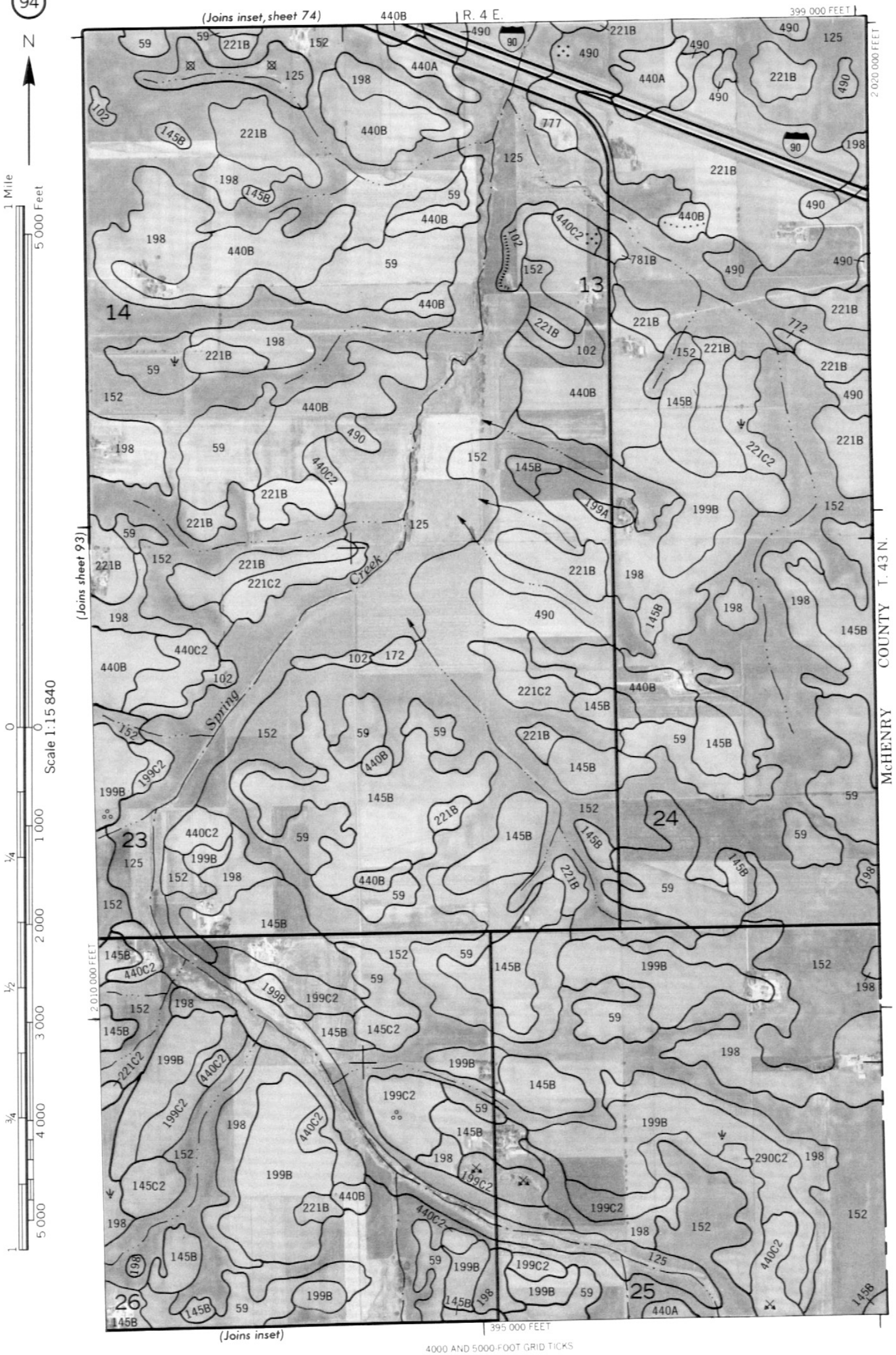

89
(Joins sheet 80)
(Joins sheet 90)
(Joins sheet 97)
(Joins sheet 88)
800 000 FEET
810 000 FEET
2 020 000 FEET
2 010 000 FEET
T. 43 N.
R. 1 E.
R. 2 E.
New Milford
Morristown
SETH B. ATWOOD PARK
KISWAUKEE
RIVER
KISWAUKEE RIVER
N
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1 000
2 000
3 000
4 000
5 000
13
16
17
18
19
20
21
24
25
28
29
30
51

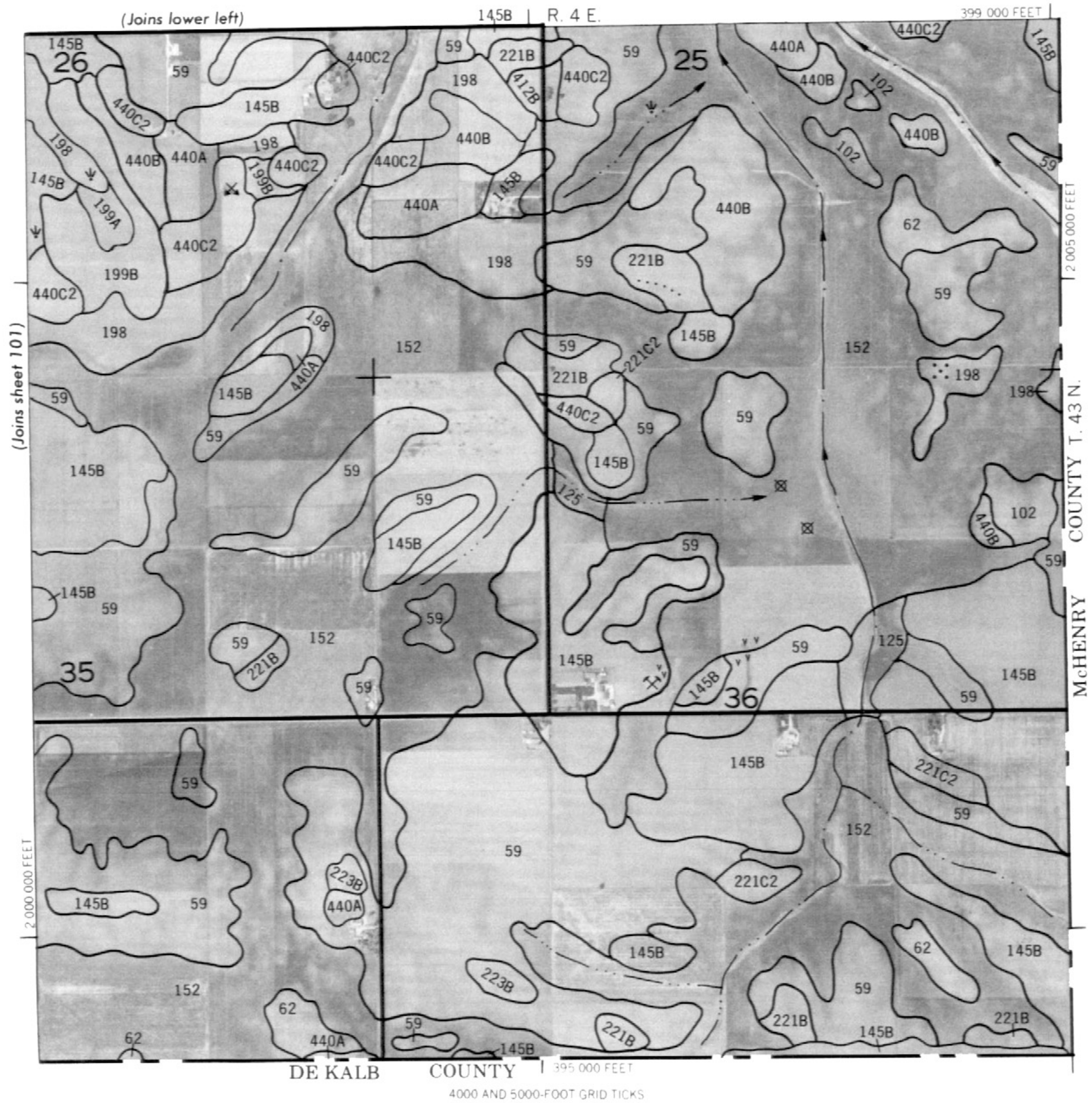

(Joins sheet 81)
R. 2 E.
830 000 FEET
N
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾
1
(Joins sheet 89)
2 010 000 FEET
2 020 000 FEET
T. 43 N.
BOONE COUNTY
(Joins sheet 91)
815 000 FEET
(Joins sheet 98)
KISHWAUKEE
RIVER
SOUTH
BRANCH
KISHWAUKEE
RIVER
16
15
14
13
21
22
23
24
28
27
26
25

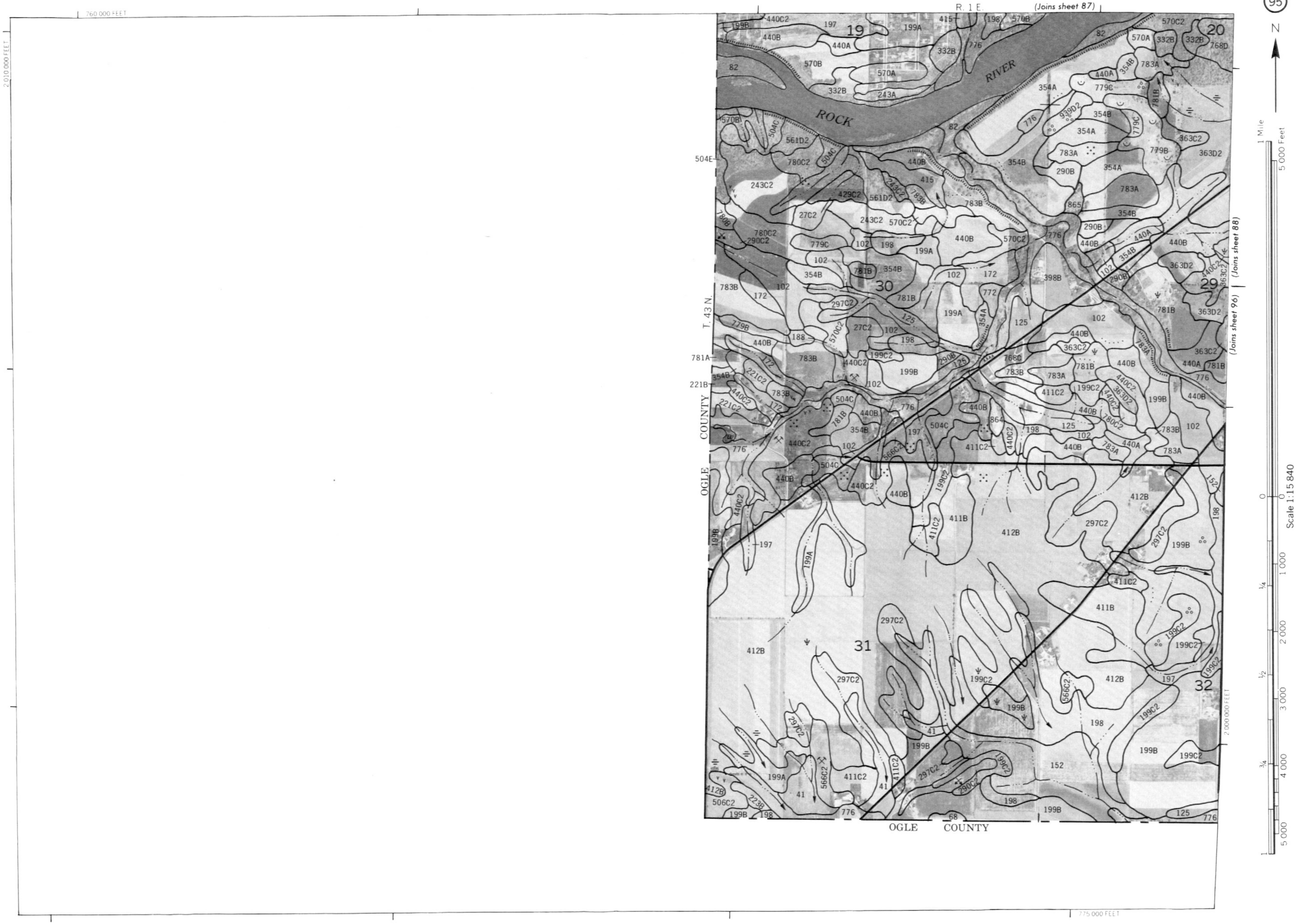

340 000 FEET
R. 3 E.
(Joins sheet 82)
(Joins sheet 92)
(Joins sheet 99)
(Joins sheet 90)
2 015 000 FEET
2 010 000 FEET
350 000 FEET
T. 43 N.
WINNEBAGO COUNTY
N
1 Mile
5 000 Feet
Scale 1:15 840
18
17
16
15
19
20
21
22
30
29
28
27

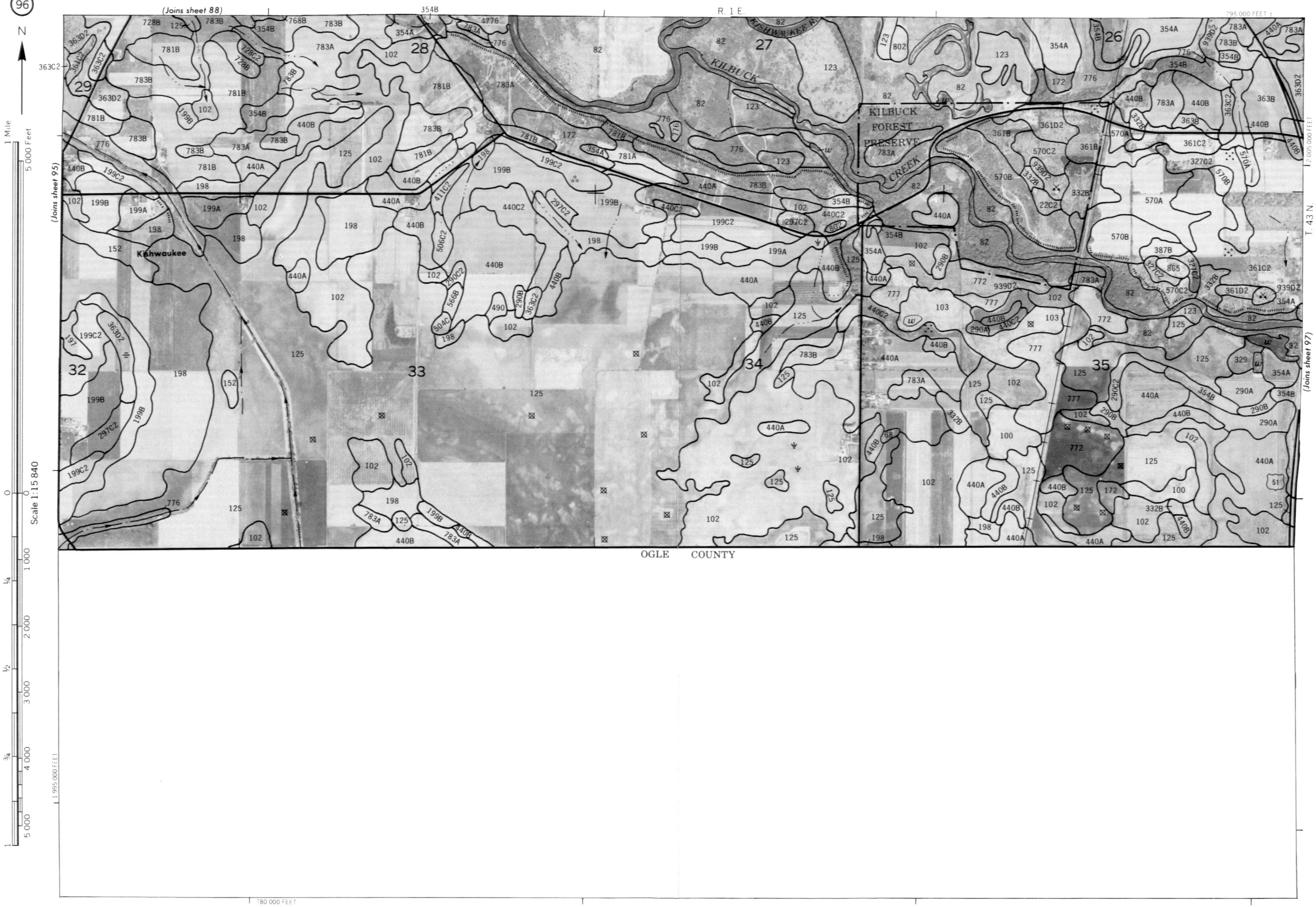

92
N
(Joins sheet 83)
(Joins sheet 91)
(Joins sheet 93)
(Joins sheet 100)
R. 3 E.
R. 4 E.
T. 43 N.
370 000 FEET
355 000 FEET
2 020 000 FEET
2 010 000 FEET
Scale 1:15 840
1 Mile
5 000 Feet
15
14
13
18
22
23
24
19
27
26
25
30

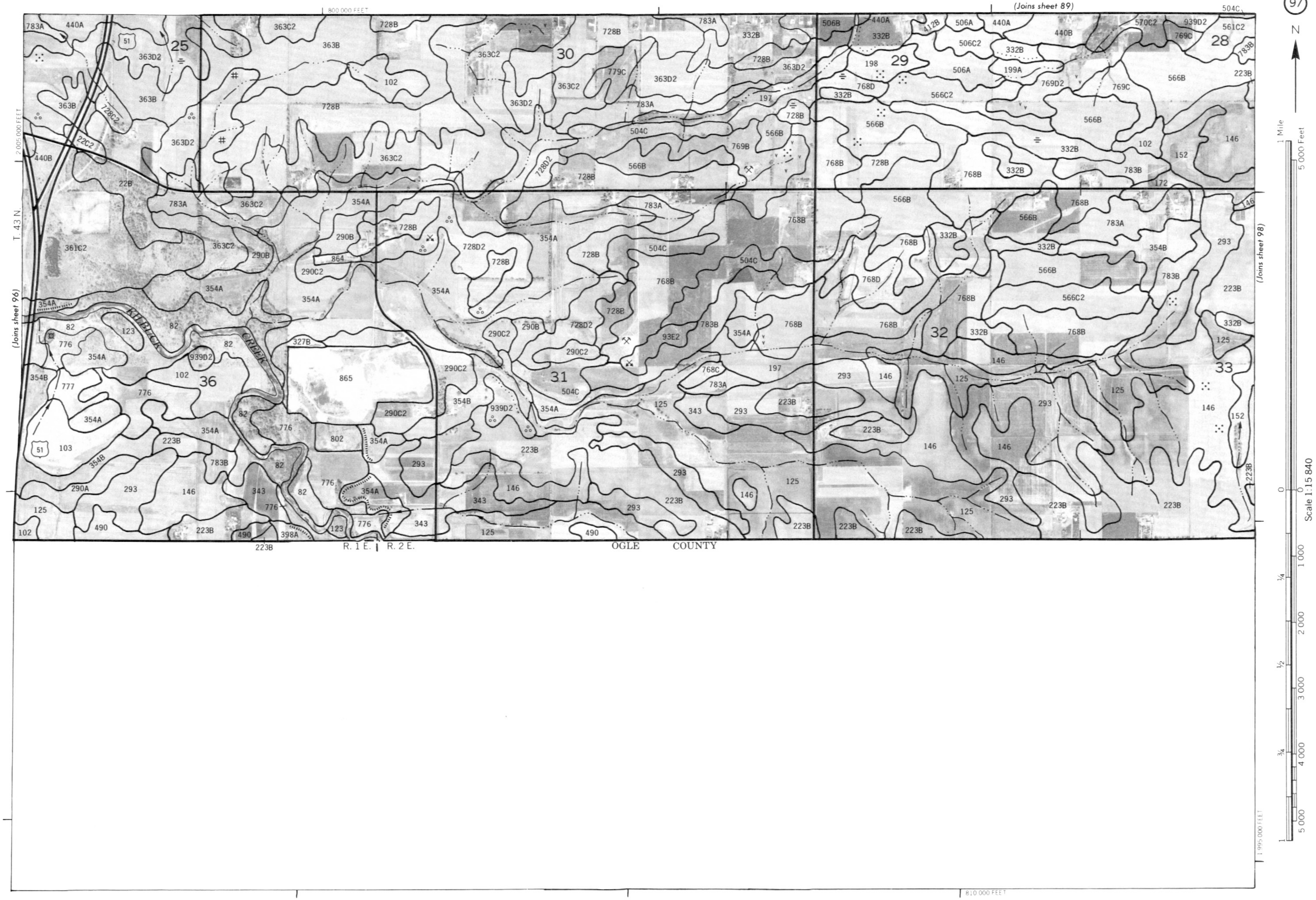

93
(Joins sheet 84)
(Joins sheet 94)
(Joins sheet 101)
(Joins sheet 92)
R. 4 E.
T. 43 N.
375 000 FEET
390 000 FEET
2 020 000 FEET
2 010 000 FEET
Mosquito Creek
N
1 Mile
5 000 Feet
Scale 1:15 840
17
16
15
14
20
21
22
23
29
28
27
26


N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins inset, sheet 74)
R. 4 E.
399 000 FEET
2 020 000 FEET
(Joins sheet 93)
Spring
Creek
14
13
23
24
26
25
McHENRY COUNTY T. 43 N.
2 010 000 FEET
(Joins inset)
395 000 FEET
4000 AND 5000-FOOT GRID TICKS

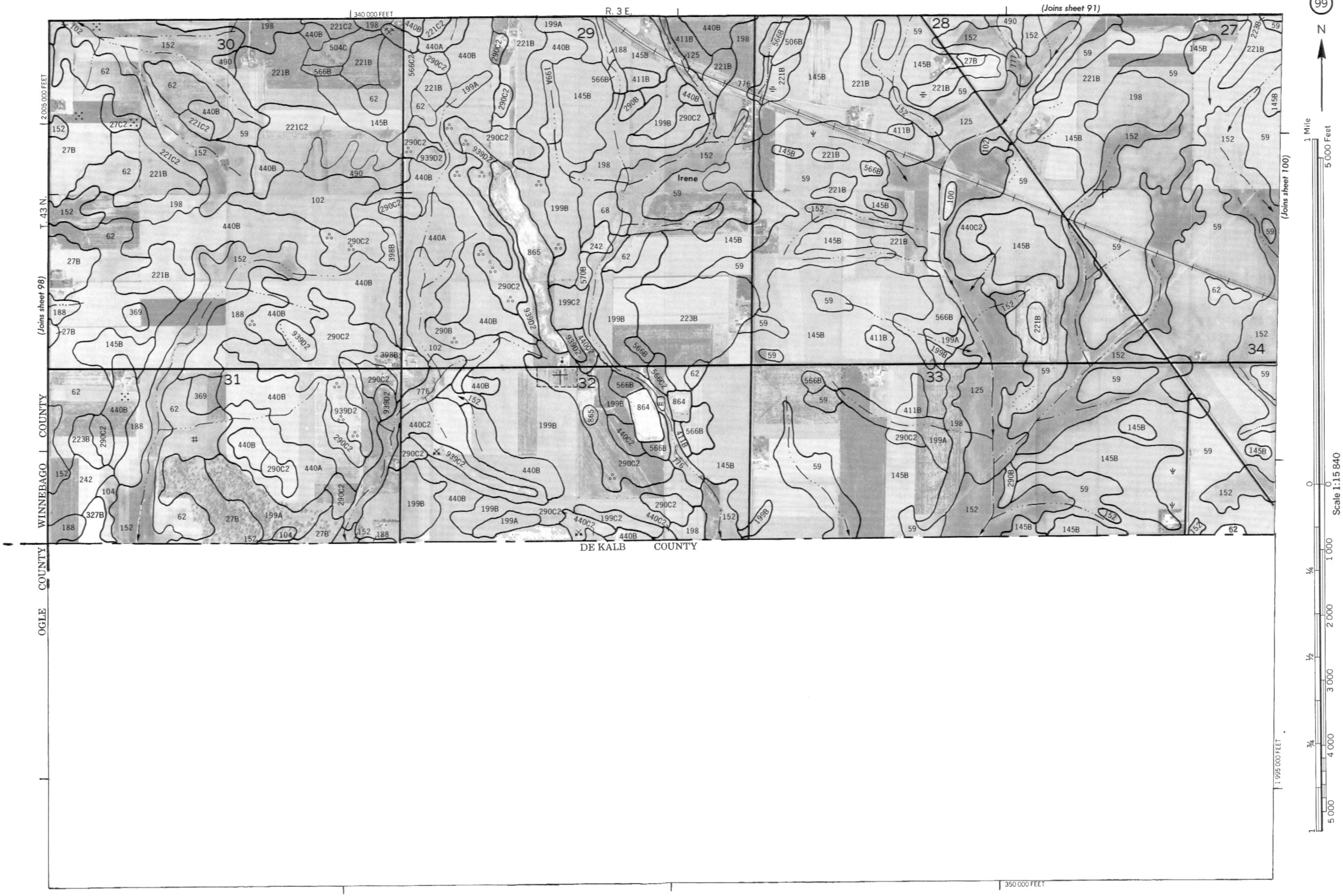

(Joins lower left)
R. 4 E.
399 000 FEET
(Joins sheet 101)
26
25
35
36
2 005 000 FEET
2 000 000 FEET
McHENRY COUNTY T. 43 N.
DE KALB COUNTY
395 000 FEET
4000 AND 5000-FOOT GRID TICKS

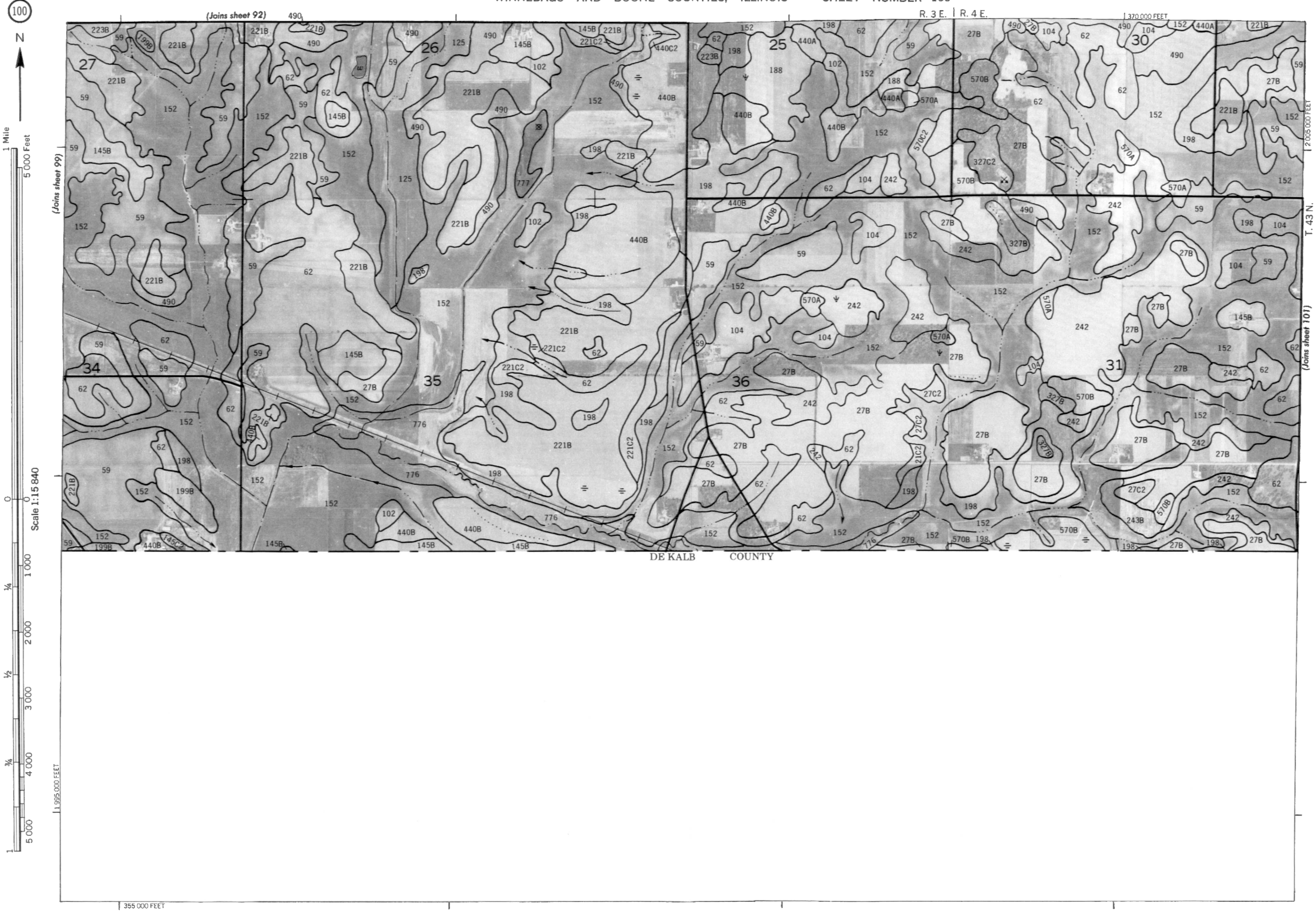

95
R. 1 E.
(Joins sheet 87)
(Joins sheet 88)
(Joins sheet 96)
T. 43 N.
OGLE COUNTY
ROCK RIVER
19
20
29
30
31
32
760 000 FEET
775 000 FEET
2 010 000 FEET
2 000 000 FEET
N
1 Mile
5 000 Feet
Scale 1:15 840


(Joins sheet 88)
(Joins sheet 95)
(Joins sheet 97)
N
R. 1 E.
T. 43 N.
KILBUCK FOREST PRESERVE
KILBUCK CREEK
KISHWAUKEE R.
Kishwaukee
OGLE COUNTY
Scale 1:15 840
1 Mile
5 000 Feet
795 000 FEET
780 000 FEET
2 005 000 FEET
1 995 000 FEET
26
27
28
29
32
33
34
35


97
(Joins sheet 89)
(Joins sheet 96)
(Joins sheet 98)
800 000 FEET
810 000 FEET
T. 43 N.
R. 1 E.
R. 2 E.
KILBUCK CREEK
OGLE COUNTY
N
1 Mile
5 000 Feet
Scale 1:15 840
25
28
29
30
31
32
33
36


N
1 Mile
5 000 Feet
0
Scale 1:15 840
1 000
2 000
3 000
4 000
5 000
¼
½
¾
(Joins sheet 90)
(Joins sheet 97)
(Joins sheet 99)
R. 2 E.
T. 43 N.
830 000 FEET
2 005 000 FEET
1 995 000 FEET
815 000 FEET
28
27
26
25
33
34
35
36
KISHWAUKEE RIVER
SOUTH BRANCH
OGLE COUNTY
BOONE COUNTY
561C2
570B
783B
566B
146
223B
152
293
125
82
198
776
440A
570C2
354A
172
363D2
440B
123
27B
188
102
242
62
783A
332B
221C2
221B
332A
329
343
781A
781B
290A
327C2
327B


99
N
(Joins sheet 91)
(Joins sheet 98)
(Joins sheet 100)
R. 3 E.
T. 43 N.
340 000 FEET
350 000 FEET
2 005 000 FEET
1 995 000 FEET
Irene
30
29
28
27
31
32
33
34
WINNEBAGO COUNTY
OGLE COUNTY
DE KALB COUNTY
1 Mile
5 000 Feet
Scale 1:15 840


100
N
(Joins sheet 92)
(Joins sheet 99)
(Joins sheet 101)
R. 3 E. | R. 4 E.
T. 43 N.
370 000 FEET
2 005 000 FEET
1 995 000 FEET
355 000 FEET
DE KALB COUNTY
Scale 1:15 840
1 Mile
5 000 Feet
0
1 000
2 000
3 000
4 000
5 000


101
375 000 FEET
R. 4 E.
(Joins sheet 93)
N
2 005 000 FEET
T. 43 N.
(Joins sheet 100)
(Joins inset, sheet 94)
29
28
27
26
32
33
34
35
Herbert
DE KALB COUNTY
1 Mile
5 000 Feet
Scale 1:15 840
1 995 000 FEET
390 000 FEET